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UNIVERSITY OF MAINE AT ORONO

Catalog for 1980-81
1981-82

UNIVERSITY OF MAINE AT ORONO

BULLETIN

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ACADEMIC YEARS

INFORMATION IN THIS CATALOG COVERS 1980-81 and 1981-82

The University of Maine at Orono reserves the right to revise, amend or change items set forth in this bulletin from time to time. Accordingly, readers of this bulletin should inquire as to whether any such revisions, amendments or changes have been made since the date of publication. The University reserves the right to cancel course offerings, to set minimum and maximum size of classes, to change designated instructors in courses and to make decisions affecting the academic standing of anyone participating in a course or program offered by the University of Maine at Orono.

APPROVED CALENDAR FOR 1980-81

ORONO CAMPUS

FALL SEMESTER 1980

Registration — should be completed before the start of classes	Tuesday, Sept. 2
Classes begin	Tuesday-Monday, Sept. 2-8
Add/Drop	Monday, Oct. 6
End of 1st five weeks for withdrawals	Saturday, Oct. 11
Fall recess begins	Wednesday, Oct. 15
Classes resume	Tuesday, Oct. 21
Midsemester reports due (covering 1st half semester)	Monday, Nov. 10
End of 2nd five weeks for withdrawals	Monday-Friday, Nov. 10-14
Registration for Spring 1981	
Deadline for filing Application for Degree (December Commencement)	Friday, Nov. 14
Thanksgiving recess begins	Wednesday, Nov. 26
Classes resume	Monday, Dec. 1
Classes end	Saturday, Dec. 13
Final exams begin	Monday, Dec. 15
Final exams end	Friday, Dec. 19

SPRING SEMESTER 1981

Classes begin	Monday, Jan. 12
Add/Drop	Monday-Friday, Jan. 12-16
End of 1st five weeks for withdrawals	Friday, Feb. 13
Mid-semester reports due (covering 1st half of semester)	Friday, Feb. 27
Deadline for filing Application for Degree (May Commencement)	Friday, Mar. 13
Spring recess begins	Saturday, Mar. 14
Classes resume	Monday, Mar. 30
End of 2nd five weeks for withdrawals	Friday, Apr. 3
Registration for Fall 1981	Monday-Friday, Apr. 13-17
Classes end	Saturday, May 2
Final exams begin	Monday, May 4
Final exams end	Friday, May 8
Commencement (tentative)	Saturday, May 9

SUMMER CAMP

Forestry (tentative)	May 11-June 19

SUMMER SESSIONS (all tentative)

Three-week sessions	June 22-July 10
	July 13-July 31
	August 3-August 21
Five-week sessions	June 15-July 17
	July 20-August 21
Six-week session	July 13-August 21
Eight-week Evening Session	June 15-August 7
All degree requests for August Commencement due in Registrar's Office	Wednesday, July 15
Graduate thesis due (tentative)	Friday, Aug. 14
Commencement exercises (tentative)	Friday, Aug. 21

BOARD OF TRUSTEES

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1 Memorial Circle
Augusta, Maine 04330
622-3157

Mr. Francis A. Brown
P.O. Box 414
Calais, Maine 04619
454-7543

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947-6767

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Dr. Elizabeth S. Russell
The Jackson Laboratory
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Mr. Thaxter R. Trafton
Arizona Coliseum
Expo Center
1826 West McDowell Road
Phoenix, Arizona 85005
602-252-6771

OFFICERS OF ADMINISTRATION

OFFICERS OF THE UNIVERSITY OF MAINE AT ORONO

President — Paul H. Silverman, Alumni Hall.

Vice President for Academic Affairs — Acting, Frederick E. Hutchinson, Alumni Hall.

Vice President for Student Affiars — Thomas D. Aceto, Fernald Hall.

Vice President for Finance and Administration — Acting, John D. Coupe, Alumni Hall.

Vice President for Research and Public Service — Acting, Bradford A. Hall, Coburn Hall.

Director of Budget and Fiscal Services — Alden E. Stuart, Alumni Hall.

Associate to the President and Director of the Office of Policy Analysis and Planning — Acting, James F. Horan, Alumni Hall.

University Librarian — James C. MacCampbell, Fogler Library.

Registrar — John F. Collins, Wingate Hall.

Director of Admissions — James A. Harmon, Alumni Hall.

Director of Career Planning and Placement — Adrian Sewall, Wingate Hall.

Director of Conferences and Institutes — John R. Benoit, 128 College Avenue.

Director of Cooperative Education/Field Experience — Ed M. Andrews, Aubert Hall.

Director of Counseling Center — Charles O. Grant, Fernald Hall.

Director of Development — George H. Baughman, North Hall Alumni Center.

Director of Engineering Services — William R. Johansen, Service Building.

Director of Equal Employment Opportunity — JoAnn M. Fritsche, Aubert Hall.

Director of Institutional Research and Director of Faculty/Professional Personnel — Anita S. Wihry, Alumni Hall.

Director of Memorial Union and Arthur A. Hauck Auditorium — David M. Rand, Memorial Union.

Director of Payroll and Employee Benefits — Dale A. MacDonald, English/Math Building.

Director of Classified Personnel — Robert E. Keane, East Annex.

Director of Physical Plant — Alan D. Lewis, Service Building.

Director of Police and Safety — Alan Reynolds, 166 College Avenue.

Director of Public Information and Central Services — Leonard N. Harlow, PICS Building.

Director of Purchases — Murray R. Billington, Service Building.

Director of Residence and Dining Halls — H. Ross Moriarty, Estabrooke Hall.

Director of Sponsored Programs — F. Philip Dufour, Coburn Hall.

Director of Student Aid — Burt F. Batty, Wingate Hall.

Director of Student Health Center — Dr. George W. Wood III, Cutler Health Center.

Director of Testing and Research — C. Thomas Skaggs, Fernald Hall.

Executive Director, General Alumni Association — Lester Nadeau, Alumni Center.

OFFICERS OF DIVISIONS OF THE UNIVERSITY

College of Arts and Sciences — Karl E. Webb, Dean, 100 Stevens Hall.

College of Business Administration — W. Stanley Devino, Dean, 8 Stevens Hall, South.

College of Education — Robert A. Cobb, Dean, 151 Shibles Hall.

College of Life Sciences and Agriculture — Kenneth E. Wing, Dean, 105 Winslow Hall.
School of Forest Resources — Fred B. Knight, Director, Nutting Hall.
School of Human Development — Barbara Csavinszky, Director, 24 Merrill Hall.
Technical Institute Division — Robert B. Rhoads, Director, 106 Winslow Hall.

College of Engineering and Science — James L. Clapp, Dean, 101 Barrows Hall.
School of Engineering Technology — William R. Gorrill, Director, 122 East Annex.

Bangor Community College — Charles R. MacRoy, Dean, Bangor Hall.

Student Affairs — Dwight L. Rideout, Dean, Fernald Hall.

Graduate School — Donna B. Evans, Acting Dean, Winslow Hall.

Honors Program — Samuel Schuman, Director, Honors Center.

Physical Education and Athletics — Harold S. Westerman, Director, Memorial Gymnasium.

Canadian American Center — Ronald D. Tallman, Director, Canada House.

Continuing Education Division and Summer Session — Edward W. Hackett, Jr., Director, 14 Merrill Hall.

Cooperative Extension Service — Austin E. Bennett, Acting Director, 100 Winslow Hall.

Maine Life Sciences and Agricultural Experiment Station — Kenneth E. Wing, Director, 105 Winslow Hall.

International Agricultural Programs — Lewis E. Clark, 1 Winslow Hall.

Maine Technology Experiment Station — James L. Clapp, Director, 101 Barrows Hall.

Institute for Quaternary Studies — Harold W. Borns, Jr., Director, Boardman Hall.

Department of Industrial Cooperation — Richard C. Hill, Director, 109 Boardman Hall.

Bureau of Public Administration — Kathryn E. Godwin, Director, 162 College Avenue.

Bureau of Labor Education — John R. Hanson, Director, 128 College Avenue.

Center for Marine Studies — Malvern Gilmartin, Director, 14 Coburn Hall.

Land and Water Resources Center — Paul D. Uttormark, Director, Coburn Hall.

Social Science Research Institute — David Kovenock, Director, 164 College Avenue.

OFFICERS OF THE DEPARTMENTS

Agricultural Engineering — Professor Norman Smith, 2 Agricultural Engineering Building.

Agricultural and Resource Economics — Professor Johannes Delphendahl, 206 Winslow Hall.

Animal and Veterinary Sciences — Professor Stanley D. Musgrave, 134 Hitchner Hall.

Anthropology — Professor David Sanger, 46 Stevens Hall, South.

Art — Associate Professor Michael H. Lewis, 104 Carnegie Hall.

Biochemistry — Professor Joseph Lerner, 227 Hitchner Hall.

Botany and Plant Pathology — Associate Professor Douglas A. Gelinas, 216 Deering Hall.

Chemical Engineering — Professor Arthur L. Fricke, 115 Jenness Hall.

Chemistry — Professor Robert D. Dunlap, 285 Aubert Hall.

Civil Engineering — Associate Professor John A. Alexander, 103 Boardman Hall.

Developmental Studies — Associate Professor Clayton A. Pinette, Eastport Hall, BCC.

Economics — Associate Professor David F. Wihry, 215B Stevens Hall.

Electrical Engineering — Professor Edmund M. Sheppard (Acting), 111 Barrows Hall.

Engineering Technology — Professor William R. Gorrill, Director, 122 East Annex.

English — Associate Professor Nancy M. MacKnight, 304A English/Mathematics Building.

Entomology — Professor Howard Y. Forsythe, Jr., 305 Deering Hall.

Food Science — Professor Elizabeth S. Barden, 208A Holmes Hall.

Foreign Languages and Classics — Professor Robert C. Carroll, 201 Little Hall.

Forest Resources — Director Fred B. Knight, 202 Nutting Hall.

Geological Sciences — Professor Stephen A. Norton, 111 Boardman Hall.

Health and Human Services — Associate Professor Robert C. White, Caribou Hall, BCC.

History — Professor David C. Smith, 208 East Annex.

Human Development — Director Barbara J. Csavinszky, 24 Merrill Hall.

Journalism and Broadcasting — Associate Professor Arthur O. Guesman, 107 Lord Hall.

Law Enforcement — Professor Howard M. Foley, Law Enforcement Building, BCC.

Liberal Studies — Associate Professor David P. DeFroscia, 123 Eastport Hall, BCC.

Mathematics — Professor Gary M. Haggard, 333A English/Mathematics Building.

Mechanical Engineering — Professor William F. Schmidt, 209 Boardman Hall.

Microbiology — Professor Bruce Nicholson, 254 Hitchner Hall.

Military Science — Lt. Col. John R. Russell, Armory.

Music — Professor Richard M. Jacobs, 125 Lord Hall.

Oceanography — Associate Professor Leslie E. Watling, Darling Center.

Philosophy — Associate Professor Douglas Allen, The Maples.

Physical Education and Athletics — Professor Harold S. Westerman, Memorial Gymnasium.

Physics — Professor Richard A. Morrow, 117 Clarence E. Bennett Hall.

Plant and Soil Sciences — Associate Professor James E. Swasey, 105 Deering Hall.

Political Science — Professor James F. Horan, 29 Stevens Hall, North.

Psychology — Associate Professor Roger B. Frey, 301A Little Hall.

Sociology — Associate Professor James E. Gallagher, 221 East Annex.

Speech Communication — Associate Professor Dwayne D. VanRheenen, 315 Stevens Hall.

Theatre/Dance — Professor James S. Bost, 270 Stevens Hall.

Zoology — Professor Franklin L. Roberts, 100 Murray Hall.

CORRESPONDENCE

Inquiries should be directed as indicated below:

General administrative matters ..... President, Paul H. Silverman

Scholarship records ..... Registrar, John F. Collins

Admission to the freshman class and to
advanced standing (Orono) ..... Director of Admissions, James A. Harmon
(Bangor) ..... Associate Director of Admissions and Counseling, Jeanette F. Ulmer

Financial affairs of students ..... Director of Budget and Fiscal Services, Alden E. Stuart

College of Arts and Sciences ..... Dean of the College, Karl E. Webb

College of Business Administration ..... Dean of the College, William S. Devino

College of Education ..... Dean of the College, Robert A. Cobb

College of Life Sciences and Agriculture ..... Dean of the College, Kenneth E. Wing

College of Engineering and Science ..... Dean of the College, James L. Clapp

Bangor Community College ..... Charles R. MacRoy

Graduate School and scholarships available
for graduate students ..... Acting Dean of Graduate School, Donna B. Evans

Summer Session ..... Director, Edward W. Hackett, Jr.

Continuing education courses ..... Continuing Education Division, Director, Edward W. Hackett, Jr.

International Agricultural Development ..... Director, Lewis E. Clark

Senior and alumni placement ..... Placement Director, Adrian J. Sewall

Financial assistance ..... Director of Student Aid, Burt F. Batty

Residence halls, Orono ..... Assoc. Director of Residential Life, Joline Morrison

Residence halls, BCC ..... Residential Life Coordinator, Douglas Miller

Off-Campus housing ..... Assistant Dean of Student Affairs, Sharon Dendurent

Foreign students ..... Advisor, Ruth D. Barry

Conferences and conventions ..... Conference Coordinator, John R. Benoit

UNIVERSITY OF MAINE SYSTEM

The University of Maine is a statewide system of public institutions of higher education. It is operated by a single Board of Trustees, which is appointed by the Governor. The chief academic and administrative officer for the system is the Chancellor, who is responsible to the Board of Trustees.

The system has university centers at Orono and Portland-Gorham, four-year colleges at Fort Kent, Presque Isle, Machias, and Farmington, and operates a community college at Augusta.

The University of Maine at Orono includes the Colleges of Arts and Sciences, Business Administration, Education, Engineering and Science, Life Sciences and Agriculture, Bangor Community College, and the Graduate School.

General Information

The University of Maine at Orono is located about halfway between Kittery, the most southerly town in the state, and Fort Kent on the northern boundary. It is on U.S. Route 2A, approximately eight miles from Bangor, the third largest city of the state. The University campus is about a mile from the business section of Orono, an attractive town of about 10,000 population, and borders the Stillwater River, a branch of the Penobscot.

History—The University at Orono was established originally as the State College of Agriculture and the Mechanic Arts under the provisions of the Morrill Act, approved by President Lincoln in 1862. The next year the State of Maine accepted the conditions of the Act and in 1865 created a corporation to administer the affairs of the college. The original name was changed to the University of Maine in 1897.

The institution opened September 21, 1868, with 12 students and two faculty members. Dr. Merritt Caldwell Fernald was appointed acting president. By 1871 curricula had been arranged in agriculture, civil engineering, mechanical engineering, and elective. From these curricula the Colleges of Agriculture, Technology, and Arts and Sciences gradually developed. Women have been admitted since 1872. The School of Education was established in 1930 and became the College of Education in 1958. The University operated a College of Law from 1898 to 1920. After this unit was discontinued in 1920, the University did not offer law courses until 1961 when a School of Law, located in Portland, was added through a merger with Portland University.

Schools of Business Administration, Forestry, Home Economics (now Human Development), and Nursing were established in 1958. The School of Business Administration became the College of Business Administration in 1965. The University of Maine at Bangor became the University's sixth college in 1974 when it was renamed Bangor Community College, Schools of Engineering Technology and Performing Arts were established in 1975.

The Maine Agricultural Experiment Station was established as a division of the University by act of the Legislature of 1887, as a result of the passage by Congress of the Hatch Act. It succeeded the Maine Fertilizer Control and Agricultural Experiment Station, which had been established in 1885.

Graduate instruction has been given by various departments for many years. The first master's degree was conferred in 1881 and the first doctor's degree in 1960. Since 1923 graduate work has been a separate division in the charge of a dean.

Beginning in 1895, a Summer Session has usually been held each year. Classes are scheduled in three three-week sessions, two five-week sessions, a six-week session and an eight-week session. Summer Session is designed for teachers, school administrators, and for college students who desire to accelerate their work.

The institution has been served by the following presidents: The Rev. Charles Frederick Allen, Dr. Merritt Caldwell Fernald, Dr. Abram Winegardner Harris, Dr. George Emory Fellows, Dr. Robert Judson Aley, Dr. Clarence Cook Little, Dr. Harold Sherburne Boardman, Dr. Arthur Andrew Hauck, Dr. Lloyd H. Elliott, Dr. Edwin Young, Dr. Winthrop C. Libby, and Dr. Howard R. Neville.

Mission—The University of Maine at Orono is the land grant university of the State of Maine. The mission of the University of Maine at Orono is to provide for the State of Maine a center of academic excellence in which are housed the resources for knowledge creation and dissemination to a statewide audience. Undergraduate and graduate programs through the doctorate are provided in selected academic fields. Basic and applied research appropriate to Maine is an ongoing responsibility, while other creative endeavors, including basic research of national or international significance, are encouraged. Organized programs of public service are provided throughout the state.

Policy Statement—It is the policy of the University of Maine at Orono that no discrimination on the basis of race, color, ancestry, religion, handicap, or age will exist in any area of the University. The University's policy is to comply with the requirements of Executive Order 11246, as amended, Titles VI and VII of the Civil Rights Act, Title IX of the Higher Education Act of 1972, the Rehabilitation Act of 1973, and the Age Discrimination in Employment Acts.

Organizations of the University—The seven-campus, statewide University of Maine system was created in 1968. It is governed by a 15-member Board of Trustees which approves all policies applying to the University as a whole. The major administrative units of the University of Maine at Orono are governed by the Vice President for Academic Affairs, the Vice Presi-

dent for Research and Public Service, the Vice President for Finance and Administration, and the Vice President for Student Affairs. Major academic units include the colleges of Arts and Sciences, Business Administration, Education, Engineering and Science, Life Sciences and Agriculture, Bangor Community College, The Graduate School, and Continuing Education/Summer Session.

The College of Arts and Sciences offers curricula leading to the four-year degree of bachelor of arts in the following fields of academic study: Anthropology, Art, Art with an emphasis on art history, Biology, Chemistry, Computer Science, Economics, English, French, Geological Sciences, German, History, International Affairs (see Index), Journalism-Broadcasting, Latin, Mathematics, Medical Technology, Modern Languages, Performing Arts (Music and Theatre), Bachelor of Music - Education, Bachelor of Music - Performance, Philosophy, Physics, Political Science, Public Management, Romance Languages, Sociology, Sociology with a Social Welfare Option, Spanish, Speech Communication, Speech Communication with a Language Disorders Option, and Zoology. Double majors are available both within and across colleges. With the approval of the Special Studies Committee, students are allowed to design their own curriculum for a Bachelor of Arts in Special Studies.

Specialized curricula which involve major work in more than one academic field are offered for those students who wish to prepare for specific vocational or professional work in industry, foreign service, medicine, medical technology, dentistry, law, social welfare, public management, fishery science, and marine biology. In addition, Interdisciplinary Concentrations are available in Canadian Studies, Developmental Disabilities, Environmental Issues and Ecological Studies, Geography, Legal Studies, Linguistics, Marxism-Socialism Studies, Public Relations, and Religious Studies.

A major program is offered in the School of Nursing at the University of Southern Maine campus leading to the degree of bachelor of science. The first two years may be taken on the Orono campus.

The College of Business Administration offers professional training in business subjects complemented by course requirements in the arts, humanities, social sciences, and mathematics. The degree of bachelor of science is awarded to those who successfully complete the requirements with a major concentration in accounting, finance, management, or marketing.

Bangor Community College offers associate degree programs in Liberal Studies, Law Enforcement, and Health and Human Services (with specific associate of science degree programs in Dental Hygiene, Chemical Addiction Counseling, Child Mental Health, Developmental Disabilities, Gerontology, and Mental Health). The Health and Human Services Division offers a certificate program in Dental Assisting and the Law Enforcement Division offers a one-year certificate program in Law Enforcement. Through an annual contract with the Maine Bureau of Rehabilitation, the Health and Human Services Division also offers a nine-month training program for physically handicapped persons in computer programming. In addition, approximately 50 special students from Eastern Maine Medical Center and 30 special students from St. Joseph Hospital's nursing programs take two semesters of academic credit on the BCC campus. There is an open admissions policy to the College. However, the career programs necessarily have individual requirements.

The College of Education offers during the academic year professional training for prospective elementary and secondary school teachers, principals, guidance counselors, physical education instructors, and supervisors and teachers of art. Alternative career options in the following areas may be included: Special Education, Child Care, Child Advocacy, Community Service, Day Care Center and Substance Abuse. The degree of bachelor of science in education is given to those who have successfully completed the requirements for the degree. Appropriate work taken through the Summer Session and Continuing Education Division may likewise be applied to the requirements for the degree.

The College of Engineering and Science offers the following study opportunities: (1) Two-year associate science degree programs, administered by the School of Engineering Technology — Civil Engineering Technology, Electrical Engineering Technology and Mechanical Engineering Technology; (2) Four-year bachelor of engineering technology degree programs, administered by the School of Engineering Technology — Electrical Engineering Technology and Mechanical Engineering Technology; (3) Four-year bachelor of science degree programs — Agricultural Engineering (jointly with the College of Life Sciences and Agriculture), Chemical Engineering, Chemistry, Civil Engineering, Electrical Engineering, Engineering Physics, Forest Engineering (jointly with the College of Life Sciences and Agriculture), Mechanical Engineering, Pulp and Paper Technology and Surveying Engineering.

The College of Life Sciences and Agriculture offers programs leading to the bachelor of science degree in the following fields: Agriculture, Agricultural and Resource Economics, Agricultural Engineering, (jointly with the College of Engineering and Science), Agricultural Mechanization, Forest Engineering (jointly by the School of Forest Resources and the Department of Agricultural Engineering), Animal and Veterinary Sciences, Microbiology, Biochemistry, Biology, Botany, Entomology, Forestry, Human Development (Food and Nutrition, Child Development, Home Economics Education, and Health and Family Life Education), Natural Resources, Plant and Soil Sciences, Recreation and Park Management, and Wildlife Management. Minor programs of study are available in Biology Education, Agricutural Science, Agricultural and Natural Resource Education, International Agricultural Development, Canadian Studies, Spanish, Entomology, Computer Science, Zoology, Food Science, Journalism, Rural Sociology, Chemistry, Mathematics, Geology, Plant Science, and Botany. It also offers preprofessional programs in Veterinary Science, Dairy Manufacturing, and Food Processing. Two-year technical training programs leading to an associate of science degree are offered in Annual Medical Technology, Animal Agriculture Technology, Agricultural Mechanization Technology, Forest Management Technology, Merchandising, Plant and Soil Technology (Landscape and Nursery Management), and Resource and Business Management.

The Graduate School offers programs of study leading to the degrees of Master of Arts, Master of Science, Master of Engineering, Master of Arts (Teaching of French), Master of Education, Certificate of Advanced Study, Master of Business Administration, Master of Music, Master of Professional Studies, Master of Public Administration, Doctor of Philosophy and Doctor of Education. Programs leading to the Ph.D. degree are available in animal nutrition, chemical engineering, chemistry, civil engineering, forest resources, history, oceanography, physics, plant science, psychology, clinical psychology, and zoology. Doctor of Education programs are available in guidance and counseling, in the language arts, in social studies education and in science education.

The Continuing Education Division (CED) provides a source of continuing education for mature and qualified persons who wish to supplement an earlier education. A variety of degree credit courses, non-degree credit courses, and special short courses, are available in the late afternoon, in the evening and on Saturday. Courses offered by means of the Division may be for degree credit or for non-degree credit.

Students in CED classes have many varied backgrounds and interests. Most of them carry on full-time occupations, have graduated from high school some time ago, and have determined for themselves the need for earning a degree or for specific courses to be used for personal or occupational development. The programs offered are designed to prepare adults to meet the challenge of change in today's world, to provide experiences in learning which will lead to fuller and richer life, and give people of Maine an opportunity for life-long continuing education.

The Summer Session offers a wide variety of courses designed to meet the needs of educators, regularly enrolled college students, and those who seek cultural and professional growth in specific fields.

Teachers, counselors, supervisors, and school administrators will find that this 9-week period of study provides an unusual opportunity for professional improvement. Workshops, conferences, and seminars specially designed for those engaged in the education professions are offered.

Regularly enrolled students of the University of Maine and other collegiate institutions likewise find an opportunity to accelerate their undergraduate programs, to make up work that they may have missed during the regular school year, or to secure additional credits in anticipation of their individual needs.

Adults not engaged in formal degree study or teaching who desire to attend the session for general purposes may do so providing all prerequisites, if any, are met.

Canadian-American Center—The Canadian-American Center is located in Canada House at 160 College Avenue. The Center coordinates Canadian Studies on the Orono campus; administers the Canada Year program; and promotes student and faculty exchanges with Canadian universities. For information on graduate and undergraduate programs in Canadian Studies, contact the director, Ronald D. Tallman.

TRIGOM—The University of Maine at Orono is a charter member of The Research Institute of the Gulf of Maine (TRIGOM). This is a nonprofit cooperation established as a consortium to carry out research and projects related to oceanography. UMO also is a member of a Canadian consortium which gives it access to The Huntsman Laboratory in New Brunswick.

OFFICE OF RESEARCH AND PUBLIC SERVICES

This office has the responsibility for planning, coordinating and administering the programs of research and public services of the University of Maine at Orono. The objective is accomplished through procedures designed to:

A. Coordinate the research and public service efforts of the colleges and other units of UMO with the goal of developing effective interrelationships between staffs, functions and projects.
B. Develop long-range goals and objectives for the research and public service programs of UMO and provide faculty and staff members with the opportunity to contribute to planning, establishing and implementing such goals.
C. Provide increased opportunity for faculty and staff members to participate in programs of research and public service by promoting multidisciplinary and interdisciplinary approaches to solving identified problems. Comprehensive and timely information on grant support is made available on a continuing basis. Organized research and public service units at UMO include the following:

The Maine Life Sciences and Agricultural Experiment Station maintains its offices and principal laboratories at Orono. Experiment farms include Highmoor Farm at Monmouth, Aroostook Farm at Presque Isle, Chapman Farm at Chapman, and Blueberry Farm at Jonesboro.

The Department of Industrical Cooperation (DIC), coordinates the work of the University in contract agreements with state and industrial organizations. The Department is located in Boardman Hall.

The Cooperative Extension Service is an educational agency representing the University of Maine and the U.S. Department of Agriculture. Educational and informational assistance in a broad range of subjects is provided to individuals, families and organized groups in rural and urban areas of the state.

County Extension Associations are the sponsoring organizations of the Extension program in each county. They function under the leadership of an executive committee with the assistance of local community leaders.

Extension Service personnel include state and area specialists, administrative staff, and Extension agents. The latter, who make up the major part of the staff, are located in each county, usually at the county seat, and carry out work with the assistance of specialists in agriculture, home economics, 4-H and other youth education, and resource development. Extension agents also provide general information about other programs and services of the University of Maine, the U.S. Department of Agriculture and other agencies serving the people of Maine.

Maine Technical Service Program assists business and industry to acquire and use scientific and engineering information more effectively.

The Bureau of Labor Education conducts programs for union and non-union employee groups covering most requested subjects, but focused on effective employee organization practices and community participation.

The Bureau of Public Administration provides in-service training for Maine municipal and state government officials, does research in areas of interest to such officials and otherwise supplies information on these and related activities to persons engaged or interested in government.

Title I HEA provides federal matching funds to encourage and support public and private universities, colleges, and junior colleges to use their facilities and personnel, through research and teaching, to help solve problems of community living with emphasis on new concepts, approaches, and programs.

The Office of Sponsored Programs provides assistance to faculty and staff in developing proposals and seeking outside funding for research, instruction, and service projects. The office, with headquarters in Coburn Hall, provides liaison with federal funding agencies and private foundations.

The Faculty Research Fund—The University Trustees have set aside two permanent funds—the Dr. Thomas U. Coe Fund, $123,000, and the William H. Weppler Fund for Faculty Research, $168,000—the income to be used each year by the faculty for carrying on any scholarly activity. From time to time some additional funds are made available to the Faculty Research Funds Committee for the same purpose. The committee meets three times a year. Applications for grants from these funds should be addressed to the Secretary, Faculty Research Funds Committee.

Faculty Summer Research Grants—A program of support to provide a limited number of grants to underwrite faculty research projects during the summer. Recipients are selected on the basis of information supplied in a proposal which explains the research project to be conducted during the period for which the grant is made. The Research Fund Committee serves as a screening committee to evaluate the proposals. Application information may be obtained from the Secretary, Faculty Research Funds Committee.

The Scientific Equipment and Book Fund award is offered once a year and awarded to faculty members for the purchase of scientific equipment or books which will be used to stimulate or support a research project. Funds are allocated to faculty members of demonstrated research ability rather than to outfit a new faculty member with basic research equipment. The Faculty Research Funds Committee serves as a screening committee to evaluate the proposals. Application information may be obtained from the Secretary, Faculty Research Funds Committee.

The Land and Water Resources Center was created in 1970 at the University of Maine at Orono to encourage and promote University interest in and interdisciplinary cooperation in environmental research, teaching, and public service, including physical, biological, and social aspects. The Center stimulates and coordinates the research, training, and educational activities in water resource disciplines, including select aspects of soils and lands. Information and education services include sponsorship of seminars, forums and workshops. The Center is advised by a body of civic leaders, scientists and administrators representing four companies, four universities, three service organizations, 10 state agencies, and five federal agencies.

The University of Maine Center for Marine Studies was approved by the Board of Trustees on September 28, 1977. Located at the Orono campus, the primary goal of the Center is to develop an internationally recognized center of excellence, emphasizing research and graduate studies. The Center provides leadership in the development of quality research programs with emphasis upon the Gulf of Maine, its related coastal zone, and other related cold water regions. The Center provides a focus for the development of planned programs. Units within the University which are components of the Center include the Joint Institutional Sea Grant Program and the Ira C. Darling Center at Walpole, Maine.

The Ira C. Darling Center for Research, Teaching and Service is the Marine Laboratory of the University of Maine at Orono. Located on Wentworth Point on the Damariscotta River in Walpole, Maine, the Darling Center has approximately 10,000 square feet of laboratory space available for faculty and graduate marine research. Dormitory space accommodates 12 year-round staff members. Summer quarters are available for an additional 16. A steel and concrete pier provides access by vessels drawing up to 15 feet. A 34-foot, diesel-powered workboat, a 34-foot, diesel-powered research catamaran, and a number of outboard boats are used for inshore and nearshore field work. Through cooperative arrangements with other institutions, faculty and students have access to offshore and open ocean areas. The library, a branch of the Fogler Library at Orono, contains several thousand volumes and an extensive reprint collection. Laboratory space for visiting investigators is available by arrangement. Summer courses in marine invertebrate zoology and ichthyology are offered.

The Sea Grant Program was established by action of Congress in 1966. Each state became eligible to apply for annual funds to focus the attention in universities on commitment to the sea. The University of Maine at Orono receives funds for research through a cooperative joint project with the University of New Hampshire which is reviewed annually by the National Sea Grant Office.

The Conferences and Institutes Division established in 1973, coordinates public service short courses, workshops, seminars, conferences, and institutes. The office is located at 128 College Avenue, UMO.

Project on Balanced Growth for Maine is involved in relating the research and other expertise of the University to the needs of the region and state in strategies and broad programs to improve the economy while protecting the natural environment. It involves continuing liaison with the leadership of the business community, labor and other groups, as well as with state agencies. The project sponsors workshops, conferences, and insures University representation at the policy level of groups with which it works. It also provides some research capabilities of its own as well as a link between the state's leadership groups and University expertise.

The Social Science Research Institute (SSRI), conducts and coordinates research in business and economics, political science, psychology and sociology. The Institute has a complete survey research unit that specializes in local and statewide surveys. Studies have included economic impact studies of several areas, two studies relating to the energy crisis, and studies of political attitudes, normlessness, public television and industrial location.

Institute for Quaternary Studies consists of faculty members in four academic units who have combined their efforts in studying the Quaternary Period. Their interdisciplinary projects relate the effects of glaciation to the physical, chemical, social and economic conditions of the present and future.

The Pulp and Paper Foundation is supported by private funding which encourages a strong teaching and research program in pulp and paper technology, with a significant scholarship program available to qualified students.

BUILDINGS—ORONO CAMPUS

The following are residence halls and dining facilities:

Androscoggin Hall (1963), capacity 248. Named for the county having the sixth largest number of regular full-time students enrolled at the University at the time of its construction.

Aroostook Hall (1963), capacity 179. Named for the county having the fifth largest number of regular full-time students enrolled at the University at the time of its construction.

Balentine Hall (1914-1916), capacity 107. Named in honor of the late Elizabeth Abbott Balentine, secretary and registrar of the University, 1894-1913.

Chadbourne Hall (1948), capacity 156. Named for Dr. Ava Harriet Chadbourne, professor emerita of education.

Colvin Hall (1930), capacity 48. Named in honor of the late Caroline Colvin, professor emerita of history and government and the first dean of women at the University. It became a cooperative dormitory for women in 1961.

Corbett Hall (1947), capacity 228. Named in honor of the late Lambert Seymour Corbett, formerly professor of animal industry and dean of men.

Cumberland Hall (1961), capacity 260. Named for the county having the second largest number of regular full-time students enrolled at the University at the time of its construction.

Dunn Hall (1947), capacity 228. Named in honor of the late Charles John Dunn, formerly Chief Justice of the Supreme Judicial Court of Maine and treasurer of the University from 1909 to 1923.

Estabrooke Hall (1940), capacity 172. Named in honor of the late Kate Clark Estabrooke, a former superintendent of the first women's dormitory, the Mount Vernon House.

Gannett Hall (1959), capacity 260. Named in honor of the late James Adrian Gannett, registrar of the University from 1913 to 1953.

Hancock Hall (1965), capacity 265. Named for the county having the seventh largest number of regular full-time students enrolled at the University at the time of its construction.

Hannibal Hamlin Hall (1911), capacity 89. Named for the late Hon. Hannibal Hamlin of Hampden and Bangor, the first president of the Board of Trustees.

Hart Hall (1955), capacity 233. Named in honor of the late John Norris Hart of Orono, dean of the University and professor of mathematics and astronomy.

Hill Top (1967-68) is a dining commons having the capacity to serve 900 persons cafeteria style. The dining commons serves Knox, Oxford and Somerset Halls. It also contains a craft center and a small convention meeting room.

Kennebec Hall (1961), capacity 180. Named for the county having the third largest number of regular full-time students enrolled at the University at the time of its construction.

Knox Hall (1967), capacity 285. Named for the county having the tenth largest number of full-time students enrolled at the University at the time of its construction.

Oak Hall (1937), capacity 96. Named for the late Hon. Lyndon Oak of Garland, a long-time member and president of the Board of Trustees.

Oxford Hall (1967), capacity 285. Named for the county having the eighth largest number of full-time students enrolled at the University at the time of its construction.

Penobscot Hall (1960), capacity 180. Named for the county having the largest number of regular full-time students enrolled at the University at the time of its construction.

Somerset Hall (1967), capacity 285. Named for the county having the ninth largest number of full-time students enrolled at the University at the time of its construction.

Stewart Commons (1963) is a dining commons having a capacity for serving 800 persons cafeteria style. This dining commons serves Androscoggin, Cumberland and Gannett Halls. Named for the late John E. Stewart, dean emertius of men, 1928-1969.

Stodder Hall (1956), capacity 170. Named in honor of the late Mrs. Anne E. Stodder of Bangor, a benefactress of the University. Its dining commons serves 700 students.

The University Cabins (1945), capacity 42 men students. These are cooperative units.

University Park (1961) is a family housing development that provides apartments for 120 families (24 three-bedroom, 48 two-bedroom and 48 one-bedroom apartments).

Wells Commons (1958) is a dining commons having a capacity for serving 1500 persons cafeteria style. This dining commons serves Corbett, Dunn, Hannibal Hamlin, Hancock, Hart and Oak Halls. Named for William C. Wells, dormitory manager and director of residence and dining halls, 1939-1972.

York Hall (1962), capacity 260. Named for the county having the fourth largest number of regular full-time students enrolled at the University at the time of its construction. Its dining commons serves 700 students.

York Village (1979), capacity 202. Apartment complex consisting of seven buildings with a total of 35 apartments and an eighth building which houses laundry and other community services.

The following are used mainly for administration and instruction:

Agricultural Engineering Building (1938) houses the Agricultural Engineering Department and its laboratories for teaching and research.

Alumni Hall (1901) contains administrative offices and offices and studios for Maine Public Broadcasting. It received its name because of contributions made by alumni to supply a part of the funds for its erection.

Alumni Memorial Gymnasium, consisting of an Indoor Field, Armory, and Gymnasium, was erected as a memorial to the Maine men who died in service of their country in the Spanish-American War and World War I and is a gift of alumni, students, faculty, and friends of the University. The Indoor Field (1926), one of the largest in the country, provides ample facilities for indoor track, winter baseball practice, and military drill. The Armory (1926) houses offices and classrooms of the military unit, including an indoor rifle range. The Gymnasium (1933) contains the offices of the Department of Physical Education and Athletics, equipment and rooms for handball, boxing, wrestling, and corrective exercise, shower and locker rooms, and an auditorium with a seating capacity of approximately 3,000 used for basketball, lectures, student assemblies, banquets, and dances. The Stanley M. Wallace pool, gymnastics and wrestling areas were added in 1971. Swimming pool and diving facilities are olympic size. The pool spectator gallery seats 500.

Aubert Hall (1914) houses the Department of Chemistry, the heavy equipment laboratories of Chemical Engineering and the Offices of Equal Employment Opportunity and Cooperative Education. It was named in honor of the late Alfred Bellamy Aubert, professor of chemistry from 1874 to 1909. A wing was added in 1940 to increase facilities. Two additional wings were added in 1958 and additional renovations were completed in 1968.

Barrows Hall (1963), contains offices, classrooms and laboratories for the Department of Electrical Engineering. It was named for the late William Edward Barrows, formerly professor and head of the Department of Electrical Engineering. The office of the dean of the College of Engineering and Science is located in Barrows Hall.

Bennett Hall (1959), contains offices, classrooms, and laboratories of the Department of Physics. It was named in honor of Dr. Clarence E. Bennett, professor emeritus of physics and chairman of the department for over 30 years.

Boardman Hall (1949) houses the Department of Civil Engineering, Department of Geological Sciences, Institute for Quaternary Studies. Department of Mechanical Engineering, Technology Experiment Station laboratories, and Department of Industrial Cooperation. It was named in honor of the late Dr. Harold Sherburne Boardman, Dean of Technology and President of the University from 1925 to 1934.

Carnegie Hall, the former library building erected in 1906 through the generosity of Andrew Carnegie, is now devoted to the Department of Art. It was named in honor of the original donor.

Coburn Hall (1888) houses offices of the Office of Research and Public Services, which include the Office of the Vice President for research and Public Services, Evnvironmental Studies Center, Project Balanced Growth for Maine, Sea Grant Office, Sponsored Programs Division, Title I, and University of Maine Technical Services Program. The Credit Union Office is also housed in Coburn Hall. Coburn Hall was named for the late Hon. Abner Coburn, a former president of the Board of Trustees and benefactor of the University.

Crosby Laboratories (1926) contain the laboratories of the Department of Mechanical Engineering. It was named for the late Hon. Oliver Crosby, Class of '76, who bequeathed $100,000 for its construction.

Cutler Health Center (1966) houses the Student Health Services. Named for Dr. Lawrence M. Cutler, a longtime member and former president of the Board of Trustees.

Deering Hall (1949) contains the Departments of Botany and Plant Pathology, Entomology and Plant and Soil Sciences, also part of the facilities for the Agricultural Experiment Station and the Cooperative Extension Service. It was named in honor of the late Dr. Arthur L. Deering, dean of agriculture, who served the University from 1912-1957.

East Annex (1947) houses the offices of the School of Engineering Technology, the Department of General Engineering, the Department of Sociology, the Classified Personnel Office, as well as supplemental faculty offices for other departments in the College of Arts and Sciences.

English-Math Building and Computer Center (1976) provides offices, laboratory and classrooms for the Departments of English and Mathematics. An attached wing contains a 350 seat lecture room. Another wing houses Data Processing and the University Computer Center.

Fernald Hall (1870) the oldest building on the campus, contains offices of the student deans. It also houses a small snack bar operated by University Stores. It was named for the late Dr. Merritt Caldwell Fernald, president of the University from 1879 to 1893.

Fogler Library (1942-1976) was erected and furnished with the aid of a fund-raising campaign by alumni, faculty, students and friends of the University. Over the years until 1968 various areas were completed for a seating capacity of approximately 1,000 and a book collection of 500,000 volumes. In the fall of 1976 a handsome addition to the original building was opened which, when fully completed, will increase the seating capacity to 2,500 and a book collection of 750,000 volumes. The Library was named in 1962 in honor of Dr. Raymond H. Fogler, a former president of the Board of Trustees.

Hauck Auditorium (1963) was erected and furnished with the aid of a fund-raising campaign by alumni, faculty, students and friends of the University. It contains an auditorium providing seating for 600 persons, stage facilities and the University Store. It was named in honor of Dr. Arthur A. Hauck, president emeritus, who served the University as president from 1934 to 1958.

Hitchner Hall (1949-1959) contains offices, laboratories, and classrooms for the Departments of Animal and Veterinary Sciences, Biochemistry and Microbiology for programs in instruction, research and Extension. It was named for the late Dr. E. Reeve Hitchner, professor emeritus of bacteriology.

Holmes Hall (1888) houses the Department of Food Science and some laboratories of the Life Sciences and Agriculture Experiment Station. It received its name from the late Dr. Ezekiel Holmes, writer, editor, and pioneer in Maine Agriculture.

Jenness Hall (1971) contains classrooms, offices and laboratories of the Department of Chemical Engineering, including research facilities for environmental studies, microscopy, fiber and materials sciences, and chemical process development. It was named in honor of Dr. Lyle C. Jenness, formerly professor and head of the Department of Chemical Engineering from 1947 to 1966. It also holds the offices of the University of Maine Pulp and Paper Foundation.

Lengyel Hall (1963) contains offices, classrooms and a gymnasium for the Department of Physical Education, women. It was named for Helen Anna Lengyel, professor emerita of women's physical education.

Little Hall (1965) houses the Departments of Foreign Languages and Psychology. Contains four general purpose lecture rooms and offices for faculty of the College of Arts and Sciences. It was named in honor of the late Dr. Clarence Cook Little, formerly professor of zoology and president of the University from 1922 to 1925.

Lord Hall (1904) contains the administrative office of the School of Performing Arts and the offices, laboratories and classrooms of its Music Division. It also houses the Department of Journalism and the offices of the Maine Campus (newspaper) and the Prism (yearbook). It was named for the late Henry Lord, a former president of the Board of Trustees.

Memorial Union (1953) is a memorial to the University of Maine men who died, and a tribute to all who served, in World War II. It is the gift of alumni, students, non-alumni faculty, and friends. This union is the center of student activities and recreational programs of the campus. It has a Memorial Room, meeting rooms, lounges, offices, snack bar, game room, bowling alleys, offices for the director of religious affairs and for student organizations, faculty-alumni lounge and dining room which serve the University community. Additional meeting rooms were added in 1961.

Merrill Hall (1931) houses the School of Human Development and the offices of the Continuing Education Division. It was named for the late Dr. Leon S. Merrill, dean of the College of Agriculture from 1911 to 1933.

Murray Hall (1967) is used by the College of Arts and Sciences for its Department of Zoology. It contains offices, seminar rooms, undergraduate and graduate student laboratories.

It was named in honor of Dr. Joseph Magee Murray, Dean of the College of Arts and Sciences from 1941 to 1966.

Nutting Hall (1968) contains offices, laboratories and classrooms of the School of Forest Resources. It was named in honor of Albert D. Nutting, director of the School of Forest Resources from 1958-71.

Pavilion Theater (1910-1979). Former Stock Judging Pavilion converted in 1979 to a theater-in-the-round with seating for 145 persons.

Rogers Hall (1928) houses administrative offices of the Department of Animal Sciences and contains research laboratories in animal nutrition and related work. It was named in honor of the late Dr. Lore Rogers, Class of '96, chief of research laboratories, Bureau of Dairy Industry, U.S. Department of Agriculture.

Shibles Hall (1961) contains facilities for the College of Education and the School of Nursing. The Instructional Systems Center and laboratories for teacher training are located in this building. It was named in honor of the late Mark R. Shibles, dean of the College of Education from 1947-1971.

Stevens Hall (1924) with two wings constructed in 1933, contains accommodations for the Colleges of Arts and Sciences, Business Administration, and the Conley Speech and Hearing Center. The Anthropology Museum is located in the south wing. It was named in honor of the late Dr. James S. Stevens, for many years dean of the College of Arts and Sciences.

Wingate Hall (1892) contains offices for the Registrar, Career Planning and Placement, Student Aid, the Office of Testing and Research and the University Planetarium. It was named for the late William P. Wingate, a former president of the Board of Trustees.

Winslow Hall (1909) houses the administrative office of the College of Life Sciences and Agiculture, its Technical Division and the Life Sciences and Agriculture Experiment Station. It also houses the Department of Agricultural and Resource Economics and the Graduate School Office. It was named for the late Edward B. Winslow, a former president of the Board of Trustees.

Other buildings include the President's House, Horticultural Greenhouses, Federal Office Building, Poultry Buildings, Scientific Research Building, Machine Tool Laboratory, Maples, Agricultural Shop Building, Agricultural Engineering Classroom Annex, Observatory, Alumni Center, University Public Information and Printing Office, Central Heating Plant, Service Building, Entomology, Honors Center, Small Animal Facility, Canada House, UMO Children's Center, Bureau of Labor Education, Bureau of Public Administration, Social Science Research Center, Police and Safety Building and Upward and Onward Building.

Fraternity Houses—The following fraternities have houses on or near the Orono campus: Delta Upsilon, Beta Theta Pi, Delta Tau Delta, Lambda Chi Alpha, Phi Kappa Sigma, Sigma Chi, Sigma Nu, Theta Chi, Phi Eta Kappa, Alpha Gamma Rho, Alpha Tau Omega, Phi Gamma Delta, Tau Epsilon Phi, Tau Kappa Epsilon, Sigma Alpha Epsilon, and Sigma Phi Epsilon.

Indoor Athletic Facilities—The University's indoor facilities for athletics and physical education on the Orono Campus include the Memorial Gymnasium, the Memorial Indoor Field House, the Helen A. Lengyel Gymnasium, the Stanley M. Wallace Pool, gymnastics and wrestling areas and the Harold Alfond Sports Arena.

The Harold Alfond Sports Arena (1977) is a 3,550 seat facility for competitive ice hockey and other ice skating activites. It is a gift of alumni, students, faculty and friends of the University. The building is named for Harold A. Alfond, a major contributor.

The Helen A. Lengyel Gymnasium has a gym floor and a large recreation room which are used by the department for intramural activities in team and individual sports, recreational games, and club activities as well as for classes. The building includes an indoor archery range, a first-aid room, and a remedial gymnasium, which is also used for folk, modern and square dancing classes.

Outdoor Athletic Facilities—The University's outdoor facilities include: On the north end of the campus, 14 tennis courts, Mahaney Diamond and one other baseball field, the football stadium (Alumni Field), three football practice fields, (one illuminated for evening practice), a quarter mile cinder track, hammer and discus fields, fields for intramural sports, a four-mile cross country course, three soccer fields, skiing facilities and a newly constructed bicycle path; on the south end of the campus, near Lengyel Hall, a hockey field, practice area, archery range and four tennis courts. In season, the hockey field is also used for soccer, speedball and softball.

Bangor Community College of UMO—All buildings on this campus were obtained from the Department of Health, Education and Welfare after the closing of Dow Air Force Base in 1967.

Residency Halls and Dining Facility:

Augusta Hall — Capacity 129
Belfast Hall — Capacity 127
Brewer Commons — Dining facility with capacity to serve 300 persons cafeteria style.
Ellsworth Hall — Capacity 129
Lewiston Hall — Capacity 117
Rockland Hall — Capacity 129

Other Housing:

Faculty Apartments: 2 units housing faculty and staff members
Student Apartment: 12 units for married and single students

Administrative and Academic Facilities:

Auburn Hall: An administration facility housing Physical Plant, Police and Safety along with several departments of the Chancellor's staff.
Bangor Hall: Contains the Dean's Office as well as classrooms, labs, and offices for the Department of Natural Science, Math and Music.
BCC Student Union: Contains administrative offices, a ballroom, dining room, game room and meeting rooms.
Caribou Hall: Contains classrooms and office for the Department of Human Services.
Dow Hall: Contains the Campus Chapel along with classrooms and offices for the Department of Humanities.
Eastport Hall: Houses the library, bookstore, offices and classrooms. Department of Social Sciences and Developmental Studies.
Former Faculty Apartments: Three units converted to provide testing and office for Admissions and classroom, lab, and office space for Law Enforcement Program.
Gym: This facility houses athletic programs at BCC.
Lincoln Hall: Contains classrooms, labs and clinic area for Dental Hygiene Program.
Portland Hall Theater: Seating capacity 500. Primarily used by the Bangor Community Theater, in conjunction with BCC Drama program.
Trustees Building: Located on Maine Avenue, on the fringe of Campus—houses the Chancellor's staff along with all administrative responsibilities of the University-Wide system.

In addition to the above, there are eighteen (18) other buildings that are occupied by non-University agencies.

University Farms—The University Farms include approximately 900 acres of land used primarily for dairy operation. One farm adjoins the campus; others are located nearby in the Stillwater section of Old Town.

The campus farm (the J. Franklin Witter Animal Science Center) includes a modern dairy barn housing an outstanding herd of registered dairy cattle representative of the leading breeds. A sizeable poultry laying flock, and a flock of sheep are also maintained on the campus farm. A heard of pleasure horses located off campus at the Smith Farm, is also part of the total farm operation.

The farms serve several purposes. They are utilized for student instruction, as laboratories for agricultural courses, and as demonstration projects for Extension programs. Research projects are continuously in progress in various segments of the operation. Milk and eggs produced on the farm are utilized by the University dormitory system.

The Dwight D. Demeritt Forest—The Dwight D. Demeritt Forest, totaling 1,750 acres and located in the Stillwater-Old Town area, is administered by the School of Forest Resources for student instruction, project demonstration, and research. An additional two acres are operated as a forestry nursery.

Fay Hyland Tract—The International Paper Company in 1974 gave to the University of Maine a tract of 360 acres of bog named the Fay Hyland Tract. This land will be administered by the School of Forest Resources as a part of the Dwight D. Demeritt Forest for student instruction, project demonstration and research.

The Harold Worthen Forest—In 1964 Harold Worthen gave to the University of Maine 250 acres of forest land in the town of LaGrange, Maine to be administered by the School of Forest Resources.

Woodland Preserve—The Woodland Preserve, consisting of two tracts of woodland and marsh totalling approximately 33 acres in the southeast corner of the Orono campus, was established by action of the board of Trustees in 1967 to provide the University community with a nearby area for the scientific study and observation of the ecology and natural evolution of forest and marsh.

OTHER FACILITIES AND SERVICES

Computing and Data Processing Services—The Computing Center supports the instructional, research, consulting and administrative needs for the University system. An undergraduate degree in computer science is offered. This degree program is administered by the Computer Science Committee through the Department of Mathematics. Courses in digital computer programming are offered by the Department of Mathematics, Chemical Engineering, and General Engineering. Non-credit courses and seminars are available to establish competencies necessary to make effective use of computing facilities. Package programs are available for most commonly used statistical work and consulting programmers are available to advise on computability.

University facilities include:

The IBM/370 (in Computing Center, Orono) which supplies both batch and time-sharing computing. Current configuration is a model 3031 with four megabyte main memory, eight 3350 and four 3330 disk drives and five 3420 tape units (two are dual density at 800/1600 psi and three are single density at 1600 bpi). The operating system is VM/370 running multiple CMS and DOS/US machines.

Typewriter based terminals are installed at all locations of the University. Intermediate-speed remote batch terminals are in operation at Augusta, Farmington, Presque Isle, Portland and Gorham campuses.

The CALCOMP 936 Drum Plotter and Controller for off-line plotting is equipped with interchangeable drums, allowing plotting on widths of 33 inches and 11.7 inches and lengths of up to 120 feet with standard increment size of 0.002 inches and with three-color plotting. The plotter is located in the Computing Center. Tektronix graphic display tubes for interactive graphics are also supported.

The PDP-11/60 (in Jenness Hall, Orono) is part of the Gottesman Computation Center. It is particularly well adapted to process control work. It has the capability of monitoring remote data acquisition as well. The facility includes a 64K work memory (16 bit words), two RKD5 disk drives (1.2 megawords), and several terminals.

The NCS 7010 Optical Mark Reader (Wingate Hall, Orono) is part of the Office of Testing and Research. This equipment can be used to convert test and questionnaire responses into a medium for further analysis on any of the other facilities.

The Instructional Systems Center—The Instructional Systems Center is a UMO service organization with the purpose of assisting faculty in the improvement of instruction. The Center is organized in four divisions to achieve this purpose. The staff of the Instructional Development Division work directly with instructors in systematically defining what should be taught, developing the methodology for teaching, and evaluating results. The Equipment Division provides audio-visual equipment such as motion picture projectors, slide projectors, and tape recorders. The Production Division prepares and produces original artwork and photography for instructional visuals. The Film Rental Library serves, primarily, the public schools in Maine, but also provides a collection of approximately 4,000 16mm films for campus use.

The Libraries—The University Libraries serve the intellectual needs of the students and faculty and stimulate the use of library materials for research and recreational reading. The libraries contain more than 500,000 volumes and receive some 3,300 periodicals. They are the regional depository for northern New England for U.S. Government publications and have a file of maps of the Army Map Service. They also are a selective depository for Canadian government publications. They extend these resources to other libraries through interlibrary loan service, to visiting scholars, and to citizens of the state whenever they can do so without interfering with local needs. Periodical articles and similar materials not available for lending may often be photocopied, subject to copyright regulations.

The University of Maine Art Collection—The University of Maine Art Collection in Carnegie Hall contains materials depicting the history of art through all ages. More than 10,000 photographs and color reproductions, and more than 20,000 slides of art masterpieces are available, on occasion, to students and faculty for study and loan. Through generous gifts in recent years the collection contains some 3,500 original sculptures, paintings, and graphic arts by outstanding American and European artists: Rembrandt, Piranesi, Inness, Homer, Hassam, Marin, Hartley, Sprinchorn, Keinbusch. Wyeth, Pleissner, Kingman, Peirce, Picasso, Matisse, Rouault, Hamabe and others. Almost all of these works are hung in public areas throughout the campus. An illustrated catalog is available on request.

The University of Maine Program of Exhibitions—Throughout the academic year and during the Summer Session the Art Collection presents each month seven different art exhibitions: four in Carnegie Hall and one each in the Photo Salon of the Memorial Union Building, the Hauck Auditorium Lobby, and the lobby of Alumni Hall. Special exhibits are arranged from time to time in Stewart and Wells Commons lounges, the library reference room and in the Maine Christian Association Building. All exhibits, open without charge, display only original art, with special preference given to professional artists and craftsmen living or working in Maine.

The University of Maine Traveling Exhibitions—As a service to the state each year, the Art Collection arranges and circulates 100 different exhibitions of original art throughout the schools and academies of Maine. There is no charge for these exhibitions, but reservations must be made before Sept. 30 for each academic year. All inquiries should be addressed to Professor Vincent A. Hartgen, Curator, University of Maine Art Collection.

Scientific Collections—The following collections are located on the Orono campus:

Botany—The herbarium in Fogler Library includes several collections, the most important of which is the one made by the late Rev. Joseph Blake and presented to the University by Mr. Jonathan G. Clark of Bangor. The late Professor F.L. Harvey left to the herbarium the general collections accumulated during his connection with the University. Other important collections are Collin's Algae of the Maine Coast, Halsted's Lichens of New England, Halsted's Weeds, Ellis and Everhart's North American Fungi, Cook's Illustrative Fungi, Underwood's Hepaticae, Cummings and Seymour's North American Lichens, and Bartholomew's Fungi Columbiana.

The herbarium has been enriched recently by the personal collections of Mrs. Frank Hinckley, Helen Paine Scoullar, Charles Curtis, Henry Wilson Merrill, Maynard Quimby, Louise Coburn, Sue Gordon, Ralph C. Bean, George B. Rossbach, K. P. Jansson, Glen D. Chamberlain and Edith C. Bicknell. Numerous centuries of Plantae Exsiccatae Grayanae are significant additions. Sixty-five thousand herbarium sheets are available.

Approximately three acres of land extending southward from the Heating Plant and between the Forest Nursery and the Stillwater River were assigned to the Department of Botany for the establishment of a Botanical Plantation in the autumn of 1934. The first three plantings were made in conjunction with Maine Day of 1935. At present, more than 300 species of trees and shrubs have been introduced. This area was recently named the Fay Hyland Botanical Plantation. Many species of ferns and flowering plants have also been included.

Entomology—A small area partly enclosed by trees of the Botanical Plantation and near the southern boundary of the Forest Nursery forms a site for a small University apiary. This apiary has approximately five colonies that are used for pollination studies.

The Edith M. Patch aphid collection, housed in Deering Hall, is one of the outstanding aphid collections in North America. An outstanding collection of grasshoppers is probably the second most extensive collection in New England. Local mosquitoes and blackflies are well represented, as are solitary bees associated with blueberries.

These are major portions of the insect collection maintained by the University for reference purposes in dealing with inquiries concerning insect pests sent in by citizens of Maine.

Geology—The geological collections of minerals, rocks, and fossils are housed in Boardman Hall.

Zoology—These collections, located in Murray Hall, consist of a working collection of bird skins, a display of bird mounts, and study collections of various groups of both vertebrates and invertebrates. An important part is formed by the Anson Allen Collection of Invertebrates and of Maine Birds, presented by Mrs. Mattie Munson; the Eckstorm Collection of Birds, presented by Mrs. Fannie H. and Mrs. P. F. Eckstorm; and the bird skin collection of the Portland Society of Natural History-Maine Audubon Society, one of the oldest of its kind in the country and consisting of 3,844 study skins.

Observatory and Planetarium—The Observatory and Planetarium are operated by University students for the Department of Physics and Astronomy. These facilities are used for programs open to the public and for projects of interested students. The Observatory houses a 12" computer-guided reflector telescope and is open on clear nights when student operators are available. Groups may visit the Planetarium on the second floor of Wingate Hall to see a variety of shows by making arrangements, in advance, through Public Information and Central Services (PICS).

The University of Maine Anthropology Museum—The Department of Anthropology has established an Anthropology Museum on the third floor of South Stevens Hall. The museum serves not only as a teaching aid for students in the department but also as an additional

cultural facility for the campus and the community. Through the generosity of many interested persons the collection includes material relating to the American Indians, Africa, the Arctic and Oceania. There are also special teaching exhibits on weapon and tool development, fossil man and race, as well as special sections on Maine Indians and Maine prehistory. Loan collections from other institutions sometimes are exhibited. The museum is open to the public whenever the University is in session. Regular hours are Monday through Friday, 9 a.m. to 3 p.m. The museum can be opened for groups at other times by appointment.

The Northeast Archives of Folklore and Oral History—The Northeast Archives of Folklore and Oral History, a part of the Anthropology Department, is located in the basement of South Stevens Hall. It is a research facility and a repository for tape recordings, transcripts of tapes and related photographs and manuscript material relevant to the folklore and folklife of Maine and the Maritime Provinces of Canada. Presently it holds over 1,300 collections, about 2,000 hours of tape recordings, about 3,500 photographs and a considerable amount of transcription, dubbing and field recording equipment. The Archives is especially strong in material on folksong, lumbering, river-driving and fishing. In cooperation with the Northeast Folklore Society, the Archives publishes *Northeast Folklore*, a journal which has been appearing annually since 1958.

University Publications—The following are included in the various bulletins and reports regularly issued by the University of Maine at Orono:

The University of Maine at Orono *Bulletin* is issued about 15 times a year to give information to students, faculty, alumni, and the general public.

The University of Maine at Orono Press publishes a growing list, including books of varied interest related to Maine and the adjoining Canadian provinces, and works both scholarly and of general interest. A schedule of titles and prices may be obtained at the PICS Building, Room 109, U. of M. Orono. Orders and other requests may also be directed to this address.

Life Sciences and Acriculture Experiment Station Publications include technical and popular bulletins and miscellaneous reports in which are reported the results of research studies; and Official Inspections which contain the results of inspections of feeding stuffs, fertilizers, agricultural seeds, fungicides and insecticides, and foods and drugs. A report of progress is issued at irregular intervals as Research in The Life Sciences. A quarterly report "UPDATE" is mailed to some 4500 individuals throughout the state. A free copy of most publications is available upon request to the Mail Room, PICS Building, University of Maine at Orono 04469.

Cooperative Extension Service Bulletins and Circulars are issued by the Cooperative Extension Service on a wide variety of subjects relating to agriculture, home economics, youth education, resource development and public affairs. Maine residents may secure a list of available bulletins and circulars upon request to the Mail Room, PICS Building, U of M, Orono.

The Maine Alumnus, an illustrated magazine of campus and alumni news, is sent to former students of the University of Maine at Orono who subscribe, and to those making donations to the Annual Alumni Fund.

Student publications are described in a section of this catalog called "Student Activities."

Counseling Center—The Counseling Center provides assistance to students with academic, vocational, personal and emotional concerns.

Counseling and psychotherapy are the most frequently used services. Opportunities for psychological evaluation, psychiatric evaluation and consultation, and self-improvement programs in such areas as interpersonal relationships and study skills are available. The Center maintains an educational-occupational information library, including college and graduate school catalogs representative of many types of school and geographical locations. Students may drop in to use these materials at any time. In order to help answer a student's questions about himself, the counselor may assign interest inventories, aptitude tests and personal preference inventories.

The Center staff provides a variety of consultation and educational programming designed to help prevent the development of problems requiring individual help, and to assist in creating an educational environment more conducive to student growth.

All students, freshmen through graduate, on the Orono and Bangor campuses of the University, are eligible for the service of the Center free of charge. Students are seen by appointment, which can be made by coming to the Center or by telephone. All visits are confidential. The main office of the Counseling Center is at 101 Fernald Hall, and most initial contacts will be made there. Psychological and psychiatric services are also provided at the Student Health Center.

Office of Career Planning and Placement—Through this office the University offers career planning and placement assistance to undergraduate and graduate students, alumni, and employers in both teaching and non-teaching fields. The office provides the following services:

1) Counsels and assists students and alumni in career planning.
2) Notifies registrants of suitable employment opportunities.
3) Assists candidates in preparing and presenting effective applications.
4) Cooperates with employers in their search for qualified personnel.
5) Informs employers of available candidates, of new academic fields, and of other pertinent developments and trends.
6) Develops career information for University men and women in both new and traditional fields of opportunity.
7) Assists students in locating summer vacation employment.

The office schedules for students each year an extensive and informative on-campus interviewing program with representatives from both teaching and non-teaching fields.

The College Teacher Division serves candidates for master and doctoral degrees interested in employment in college and university positions.

No charge is made to students or employers for the services of the Office. A nominal charge is made for services to alumni.

Office of Student Aid—The Office of Student Aid processes applications for scholarships. University loans, loans under the Higher Education Act, Educational Opportunity grants and a variety of part-time and summer jobs both on and off the campus. Detailed information on student aid will be found by consulting the index.

International Student Adviser—The University maintains an office for the information and assistance of all students who are not citizens of the United States.

The University wants each international student to have the best possible educational and personal experience while he or she is in the United States and especially while at the University.

The International Student Adviser's Office assists students in understanding the administrative regulations of the institution; local, state and national laws; accepted standards of conduct; and expectations and reactions of those he will encounter while in a new cultural environment.

This office is responsible for issuance of the U.S. Immigration I-20 or IAP-66 Forms necessary for the international student to obtain a student visa from the American consul in his or her homeland. All international students including those with "F" student or "J" exchange student status must report to the International Student Adviser's Office as soon as convenient after arrival on campus. Advice concerning immigration regulations, necessary forms, etc., is available so that international students may remain in the United States as long as is properly necessary to achieve their educational goals.

Health Service—The Cutler Health Center offers a comprehensive health care program for all students including part-time students and CED students. Those who wish to enroll in the program must prepay a health fee of $32 per academic year *before the end of the first two weeks of classes*. For those who fail to enroll by the end of that period or who choose not to participate in the program, health care will be provided on a fee for service basis. Ordinarily such fees will be considerably higher than the prepayment fee. The following services are offered:

1. Out-patient services provided by Health Center personnel for illnesses and accidents.
2. Provision for 24-hour emergency care for currently enrolled students while the University is in session.
3. Health promotion programs and services.
4. Diagnostic laboratory and x-ray services.
5. Immunizations and allergy injections.
6. Pharmacy services.
7. Gynecological and contraceptive services.
8. Coordination of the student health and accident insurance program to ensure maximum benefits to students.

In addition, the Cutler Health Center includes an 18-bed licensed hospital. Charges are made for hospital services. Our current daily room rate is $50 a day. These charges are covered fully by the student health and accident insurance plan. They are also covered by most Blue Cross plans but at only 80% of the charges.

The Health Center staff consists of full-time physicians, part-time medical specialists, nurse practitioners, registered nurses, clinical psychologists, and ancillary personnel.

Religious Affairs—Seven religious groups provide opportunities for religious programming, worship, study, conversation and witness: Hillel Foundation for Jewish students, Maine Christian Association for Protestant students, St. George's Greek Orthodox Church for Greek Orthodox students, and Our Lady of Wisdom Chapel and the Newman apostolate for Roman Catholic students. The chaplains are available for counseling or instruction. The Intervarsity Christian Fellowship and Navigators, two approved student organizations, meet weekly in different campus locations, e.g. the Memorial Union.

Questions concerning the above may be directed to the Office of the Dean of Student Affairs, second floor of the Memorial Union.

Local Churches and Synagogues—The churches and synagogues of Orono, Old Town, and Bangor always welcome the attendance of University students. The Drummond Chapel, a small meditation room open to the University community, is located in the Memorial Union.

The Office of the Dean of Student Affairs, Memorial Union, serves as a resource in the areas of religious affairs.

Use of Laboratory Apparatus—Many laboratory courses involve instruction in and the use of various types of power equipment and laboratory apparatus. The University takes every precaution to provide competent instruction and supervision of such courses. It is expected that students will cooperate by following instructions and exercising caution. In case an accident does occur, resulting in personal injury, the University can assume no responsibility. Student Health and Accident Insurance is recommended.

ACADEMIC INFORMATION

Degrees—The University awards the following degrees: *Associate of Arts*, to those who complete the appropriate two year curriculum at Bangor Community College. *Associate of Science*, to those who complete the appropriate two year curriculum at Bangor Community College, The College of Engineering and Science, or The College of Life Sciences and Agriculture. *Bachelor of Arts*, to those who complete a four year curriculum in the College of Arts and Sciences. *Bachelor of Arts in Special Studies*, to those who complete this four-year curriculum in the College of Arts and Sciences. *Bachelor of Music*, to those who complete this four-year curriculum in the College of Arts and Sciences. *Bachelor of Science*, to those who complete the prescribed four-year curriculum in the Colleges of Business Administration, Engineering and Science, or Life Sciences and Agriculture. *Bachelor of Science in Education*, to those who complete this four-year curriculum in the College of Education. *Bachelor of University Studies*, to those who complete the prescribed program in the Division of Continuing Education and Summer Session. *Certificate in Pulp and Paper Management*, to those who complete the requirements for a Bachelor of Science Degree plus a year of collateral study in the Pulp and Paper Management curriculum.

In order to be considered for graduation, a student must complete an *Application for Degree or Certificate* form during the semester he plans to graduate. These forms are available in the Registrar's Office. Although every effort is made to include all potential degree recipients on graduation lists, failure to file an application for degree with the registrar's Office may result in no degree being awarded, if, for any reason, application is made, but no degree is conferred, another application must be submitted prior to the next commencement. *A minimum residence of one year is required for the attainment of any bachelor's degree.* This regulation refers to the senior year. Two exceptions to this regulation were approved by the Trustees in 1978:

(1) Exceptions may be made for students who have already completed *three or more years at the University of Maine at Orono* who may be given permission by their academic dean, when there is sufficient and valid reason, to complete the senior year elsewhere under the general supervision of their Orono dean's office.

(2) Students who have completed a minimum of *three years of work at the University of Maine at Orono* and who have been admitted to an accredited professional school of medicine, dentistry, veterinary medicine, or divinity, either directly or after intervening military service, may qualify for the appropriate bachelor's degree at the University of Maine at Orono upon receipt of the professional degree, provided that their collegiate dean at Orono approves. This policy is retroactive. Inquiries about degrees awarded under this exception should be addressed to the Registrar.

Registration—Undergraduates at the Orono campus will register in accordance with the following:

Freshmen—All members of the incoming freshman class are required to attend one of several orientation sessions held during the summer prior to the start of classes at the Orono

campus. The dates when these are held each year are furnished to incoming freshmen and their parents, and parents are strongly urged to attend the orientation program with their sons and daughters.

Registration for the fall semester is accomplished during the orientation period in consultation with representatives from the faculty. During this time, information is distributed regarding the start of classes, arrival at dormitories, etc. for the beginning of the semester in September.

Upperclassmen—Upperclassmen transferring to Orono or being readmitted to Orono should contact the dean of their prospective college (upon being admitted to the University) to register for the upcoming semester.

In the spring all currently registered students planning to return to UMO the next fall must meet with their adviser to register for the upcoming fall semester.

Academic advisers are assigned all students for help in planning their educational programs to ensure their meeting graduation requirements, for counsel and guidance in academic work, and for advice about study or classwork problems. *The final responsibility for fulfilling degree requirements, however, rests with each student.*

Baccalaureate Degrees with Distinction are conferred at commencement for the following attainments in rank:

Seniors having an average grade of 3.50 or above will be graduated with Highest Distinction, 3.25 to 3.49 with High Distinction and 3.00 to 3.24 with Distinction if they meet the criteria listed below.

The average grade is based on the student's total work on the Orono campus which must include sixty (60) hours of resident study at the University of Maine at Orono at the time of graduation. Candidates must take their senior year at the University of Maine at Orono.

Degrees with Honors, with High Honors, or with Highest Honors are awarded to seniors who successfully complete the Honors Program.

Valedictorian and Salutatorian—From the graduating seniors at the May commencement, the two highest ranking baccalaureate degree candidates are designated class valedictorian (highest) and salutatorian (next highest). This rank is based upon the first seven semesters' attendance, all of which must have been in resident instruction at the University of Maine at Orono.

The following advanced degrees or certificates are offered by the Graduate School:

Master of Arts and Master of Science with designation of the major subject or field.
Master of Arts in Teaching French
Master of Arts in Liberal Studies
Master of Business Administration
Master of Education
Master of Engineering with departmental designation
Master of Music
Master of Professional Studies with department designation
Master of Public Administration
Certificate of Advanced Study with a planned program
Doctor of Education
Doctor of Philosophy with designation of major field

Grading System—Grades at the University are given in terms of letters as follows. (For purposes of comparison these letters carry the following values for undergraduate students: A = 4, B = 3, C = 2, D = 1, E = 0; (for graduate students both D and E grade = 0.)

Passing undergraduate grades: A, Excellent; B, Good; C, Satisfactory; D, Low-level passing; P, Passed for degree credit on a *Pass/Fail* basis.

Passing graduate grades: A, Excellent; B, Good; C, may be considered satisfactory by specific approval of student's advisory committee. Acceptable, applied to satisfactory thesis only.

Failing grades:

E, failed. (F. Failed a pass/fail course (does not count in grade point average.)
L, stopped attending

Progress grade: R, final grade deferred (Primarily for thesis).

Deficiency grades: I, deficiency in course work. May be made up within periods stated in the Student Handbook.

Non-credit grades: W, dropped without penalty.

Each college sets its own graduation requirements in terms of grades or grade points. Candidates for associate and baccalaureate degrees must: (a) receive passing grades in all courses

required by the major department, at a grade point level specified by the department or college (in no event less than 1.8, and usually at least 2.0); and (b) accumulate the number of degree hours specified by the college for the curriculum pursued. Details are given under each college's listing.

The degree hours are the sum of the course credit hours of those courses which may be counted toward a degree, provided a passing grade has been received.

The accumulative average is the quotient of the grade points divided by the total hours, carried to two decimal places. The grade points are the product of the course credit hours and the numerical value of the letter grade: A = 4, B = 3, C = 2, D = 1, E = 0. The total hours are the sum of the course credit hours from all courses except those taken on a Pass-Fail basis. Pass-Fail registrations do not affect the grade point average.

Degree requirements for graduate students are given in the Graduate School catalog.

Grade reports are sent in the student's name to an address designated by the student. (Campus addresses are not considered valid grading addresses.) A student's academic performance is considered confidential information and written permission of the student is required to fulfill inquiries by those persons outside the administrative or academic community of the University of Maine at Orono.

Considerable care is taken to ensure that course registrations and grades entered on a student's permanent record are accurate. Any student who, upon receipt of a semester final grade report, suspects an error has been made should take the matter up immediately with the instructor. Records are assumed to be correct if a student does not so report to the Registrar's Office within six months of the completion of a course.

Some Student Regulations—Much information of interest to students is contained in the *Student Handbook* available in the Office of the Dean of Student Affairs. A few policies of general interest are given here.

It is assumed that all students entering the University are willing to subscribe to the following: *A student is expected to show, both within and outside the University, respect for order, morality, and the rights of others, and such sense of personal honor as is demanded of good citizens.*

The University requires certain standards of academic performance and of general good character for admission; if these are not maintained, the University suspends or dismisses the student. Every effort is made to provide adequate academic and personal counseling for all students, with the aim of enabling them to successfully complete their courses of study.

Students are permitted to have and to operate motor vehicles on the campus, but all such vehicles must be registered in the office of Mr. William Prosser, Security Registrar, Police and Safety Office, and bear an official University sticker. There is a registration fee. During holiday vacations students must remove their vehicles from campus.

Dismissal and Suspension—Students may be dismissed or suspended from the University for unsatisfactory work (academic dismissal or suspension), for misbehavior (disciplinary dismissal or suspension), or for mental or physical health problems (administrative disenrollment). Dismissed students are ineligible to register for credit or noncredit in any division of the University during dismissal; suspended students for the duration of the suspension.

Withdrawal—Students who desire to withdraw from the University for any reason must secure a withdrawal slip from the Registrar's Office and have it completed. Failure to do so may result in failing grades being recorded in all courses at the end of a semester. Additionally, withdrawal after the final date of the "withdrawal with penalty" period set by the University as detailed in student regulations, except for approved emergency reasons, will result in failing grades.

Indebtedness to the University—Bills are due no later than the registration day for each session. Unpaid and overdue balances in a student's account at the University Business Office result in the withholding of transcripts, until satisfactory arrangements can be made with the Bursar or Business Manager. When tuition and/or room and board payments for a semester already in progress remain unpaid beyond the due date without acceptable arrangements for payment having been made, a student's academic registration may be cancelled and dormitory occupancy terminated. Further registration may be denied until the account is current.

The University Police—The Department of Police and Safety provides complete police service to the University community. This is available on a 24-hour basis. The University Police Department is primarily a service organization, eager to assist the students, faculty and staff in any way possible. Among the services rendered are: ambulance, passport photographs, job applicant fingerprinting, firearms safekeeping, information, and valuable property registration.

The University police strive to set the example in the police field so that the student is exposed to competent, thorough police protection. Both graduate and undergraduate students are appointed by the University Police to work with the department. The department's duties include, but are not limited to, the protection of life and personal liberties, protection of property, enforcement of University regulations and state statutes, traffic and parking control, and the prevention of crime. The department works with other University departments and maintains liaison with local, state, and federal law enforcement and public safety agencies. Each police officer is a trained, licensed ambulance attendant.

Responsibility for Personal Property—*The University does not under any circumstances assume responsibility for loss of or damage to personal property through fire, theft, or other causes. Persons desiring protection against possible loss or damage should purchase appropriate insurance unless it is found that parents already have desired coverage by means of a family policy.*

THE UNIVERSITY HONORS PROGRAM

General—The University Honors Program is open to all qualified undergraduate students in the University. Its purpose is twofold: (1) to introduce students of high scholastic potential to the major areas of knowledge—mathematics and science, social studies, literature, philosophy, and fine arts—through individual reading and small group discussion; and (2) to develop their skills to as high a degree as possible in the field in which they choose to concentrate.

The program in the freshman and sophomore years is the same for all colleges and is administered by the Honors Council. Its task is the orientation of the student to the broad perspectives of the academic world.

The programs for the junior and senior years vary somewhat from college to college and are administered by the Honors Committee of each college. Their task is to sharpen and focus the student's abilities in his/her own field of specialization.

Content—A limited number of highly qualified students from each entering class are selected to begin the Honors Program in their first semester. The theme of the freshman year in Honors is a study of the seminal ideas of western civilization. Emphasis is placed on the reading and discussion of source materials. In the spring semester, some students with fine first-semester records are admitted to the program. The sections of the freshman course are limited to 12 to 14 students each.

During the sophomore year, honors work is based on small group tutorials, each group consisting of three or four students. Each group meets weekly with a tutor for the discussion of books and ideas from the honors reading list. Every group does substantial reading in three or four major areas of thought each semester.

In the junior year the student develops a concentration in the major field. The work in honors may be a course of study under tutorial supervision designed to acquaint him or her with the major field, or, at the option of the college Honors Committee, he or she may take an interdisciplinary seminar in one semester of the year.

For the senior year, a thesis or research project, within or closely related to the field of primary interest, is the major part of the Honors Program. A final comprehensive examination before a faculty board tests the student's accomplishments in both objectives of the program: breadth of knowledge and depth of specialization within the major field.

Degree—The degree of honors awarded—Honors, High Honors, Highest Honors—depends upon three factors: the student's accumulative average over seven semesters; the quality of his senior thesis or project; the performance on the comprehensive examination. In order to receive a degree with Honors, a student must have a minimum of four semesters' work in the Honors Program, including both semesters of the senior year, and at least one semester of sophomore group tutorials.

Entry—Selected entering freshmen are invited to enter the program on admission to the University; others are admitted at the end of their first semester. In addition, a substantial number of students are admitted at the beginning of the sophomore year, and some at mid-years in the sophomore year.

Admission—Students are recommended for the Honors Program by the Honors Committee of the college in which they are registered and admitted to the freshman and sophomore programs by the Honors Council. To be eligible for consideration for the Honors Program, a student should normally have a point average of 3.0 or better, have high C.E.E.B. test scores, and show curiosity, initiative, and intellectual flexibility in the work he has done. Students wishing to join the Honors Program should consult the secretary of their college Honors Committee:

Life Sciences and Agriculture, Prof. Homer B. Metzger, Winslow Hall; Arts and Sciences, Associate Professor Samuel Schuman, Honors Center; Business, Assistant Professor Jabob Naor, South Stevens; Education, Professor John A. Lindlof, Shibles; Engineering and Science, Associate Professor Bruce Jensen, Aubert.

Council—The University Honors Council, consisting of the Vice President for Academic Affairs as chairman, the secretaries of the College Honors Committees, three at-large faculty members, and four students nominated by the Organization of Honors Students, administers the common program of the first two years and coordinates the work of the College Honors Committees. All questions in regard to the University Honors Program should be addressed to Professor Schuman, Honors Center, Director of the University Honors Program.

Honors Courses (Hr)

41.45 Freshman Honors Seminar—Readings and discussion on basic concepts in the arts and sciences in Western culture. Normally taken in the freshman year. Cr 3.

46. Honors Summer Readings: Basic—Optional for those who have taken course 45. An individually arranged program of readings is independently pursued in the summer. Cr 1.

47.48. Honors Group Tutorial—Small group discussion, under tutorial direction, of books representative of the various fields of liberal education. Cr 3.

49. Honors Summer Readings: Intermediate—Guided summer readings and reports, individually adapted to the student's program. Primarily for students who have had only one semester from Hr 47.48. Cr 1.

60. Honors Independent Study—A tutorially conducted study of a topic outside the student's major field. Cr 1-3.

62. Honors Independent Research—A research project done under the supervision of a faculty member. The project may not be substituted for the senior research project; it may be related to it, or it may be in another field of study. Cr 1-3.

63. Honors Specialized Seminars—Group study of a problem lying outside of normal course offerings. May be student or faculty generated, with the approval of the Honors Council. Not offered every semester. Cr 1-3.

150. Honors Seminar—Discussion groups in such fields as the arts, philosophy and history of science, aspects of the study of society. Content varies from year to year. Normally taken in the junior year. Cr 3.

151.152. Honors: Specialized Studies—A tutorially conducted study of the student's major field, resulting in the choice of a thesis topic. Cr 3.

153.154. Honors Thesis—The planning and completion of an honors thesis or research project. Cr 3.

170. Honors Distinguished Lecture Series—A series of lectures by a distinguished lecturer or lecturers, involving collateral reading and group discussions. Not offered every semester. Cr 1-3.

STUDENT GOVERNMENT

Student Government at UMO is coordinated by the president and vice president of the student body. Student Government has access to any and all university offices. The Student Government works closely with the office of the Dean of Student Affairs. The Student Government reports recommendations concerning students to the Orono Council of Colleges. UMO president, the chancellor, and the board of trustees. The president of Student Government is responsible for about 200 student appointments to various university committees. These committees are concerned with such areas as discipline, residence halls, student-faculty relations, calendar, traffic, athletics, and many more.

Student Government is organized into seven boards, and the General Student Senate. The activities of Student Government are coordinated by the finance committee in financial matters and the executive committee in other areas. Each committee has representatives from the various boards of Student Government.

The legislative body of Student Government is the general Student Senate. It is a geographically apportioned body representing all students. Elections for the General Student Senate are held in the fall of each year. The Senate sets policy for Student Government, and is responsible for distribution of the Student Activities Fee.

The major boards of the Student Government are:

Off-Campus Board—Provides programs and services for off-campus students. These include a food co-op, a tenants' union, and a housing file.

Inter-Dorm Board—Provides programs and services for dormitory students. These include refrigerator rental and many social programs.

Student Entertainment and Activities Board—Includes the Concert Committee. Provides programming, concerts and movies for students.

Student Community Services Board—Coordinates many student services provided by student government.

Student Legal Services Board—This program has two full-time attorneys and a large paralegal staff.

The Student Government Center is located on the top floor of the Memorial Union. The office is open during the day. Feel free to stop by at any time and get acquainted with those involved in Student Government.

Scholastic Honor Societies—These groups recognize attainment and promise in the academic field by selecting for membership undergraduates whose accumulative point averages are not lower than 3.0 after completing five or more semesters of college work or 3.3 after completing less than five semesters. The date indicates when the chapter was established at the University.

Phi Kappa Phi (1897) (Founded at University of Maine, Orono)—All colleges
Tau Beta Pi (1911)—Engineering
Phi Beta Kappa (1923)—College of Arts and Sciences
Alpha Lambda Delta (1970)—Freshman Women
Omicron Nu (1931)—Home Economics
Kappa Delta Pi (1932)—College of Education
Sigma Xi (1948)—Scientific research

Student Organizations—A complete listing of departmental and professional honor societies, departmental clubs, and other student organizations appears in the *Student Handbook*.

Musical Organizations—Students have many opportunities to continue their musical training and experience, either through the degree programs in music (details of these programs are listed under the College of Arts and Sciences and the College of Education), or through participating in any of the several organizations either for credit or non-credit. There are also smaller instrumental ensembles for the more advanced musicians.

For a description and course numbers of the following musical organizations, see the music courses listed in the College of Arts and Sciences section of this catalog.

University Singers—U of M's most select choral organization; 52 mixed voices selected from applicants who have had considerable singing experience. This group sings extensively on the campus and throughout the state during the school year. The literature it performs embraces all periods of music history—Renaissance through the most recent contemporary. Touring itinerary frequently includes appearances outside the state.

University Orchestra—Composed of students for the purpose of preparing and performing standard orchestral repertoire. At least four concerts are presented annually. The spring concert features student soloists in a concerto program.

Oratorio Society—A choral organization of approximately 85 singers specializing in performing larger works with orchestra and soloists.

Marching Band—Open to all with previous band experience. The Marching Black Bears perform at most home and some away football games. Rehearsals start the weekend prior to classes and continue three afternoons per week at 4:10 p.m. Commences concert music rehearsals after last game in November.

Concert Band—Spring semester counterpart of Marching Band. Open to all with previous band experience. Rehearses two afternoons per week. Performs a variety of concert music from Bach to rock both indoors and outdoors, on and off campus.

Chamber Singers—A small group of mixed voices specializing in vocal music especially written for this performing medium. Several appearances during the year, both on and off campus.

Pep Band—Meets one evening per week. Marching Band membership prerequisite. Provides supplementary music rehearsals on marching shows and performs at home basketball and hockey games during winter.

Symphony Band—Membership by audition. Rehearses three afternoons per week at 4:10 p.m. Performs the finest and most challenging of band literature. Performs on and off campus, touring for one or two class days in the spring.

University Chorus—Primarily for the inexperienced singer who wishes to acquire sufficient background for participation in other choral organizations.

Ensembles: Brass, Woodwind, String. Limited participation by qualified students for study and performance of chamber music written especially for small ensembles.

20th Century Music Ensemble—Rehearsal and performance of 20th century music. Membership through audition. Attendance at all rehearsals and performances required.

Opera Workshop—For those singers who wish to participate in opera theater productions. Full-scale operas from standard repertoire are staged and presented through a collaborative effort of the Divisions of Music and Theatre of the School of Performing Arts.

University Theatre—The University Theatre is a division of the School of Performing Arts. The theatre provides an opportunity for all students to participate in every aspect of theatrical production, including stage and house managing, lighting, costuming, acting, directing, publicity, scenery, properties, and makeup. As a contribution to the cultural growth of the University community, the theatre offers productions which cover the full range of dramatic expression.

The Dance Club—Movement Unlimited, is involved with organizing and hosting visiting artists and companies at UMO and offering workshops and classes on a monthly basis for the general student body. Past offerings have included yoga, ballet, improvisational games, jazz, choreography, movement fundamentals and relaxation. A monthly newsletter lists workshops, classes, residencies.

Dance Workshops—For those dancers who wish to participate in dance production and perform in UMO Dance Company presentations.

Debate and Forensics—The University forensic program provides opportunities for experience in debate, discussion, extemporaneous speaking, oral interpretation, and original oratory. The program, under the administration and supervision of the Department of Speech, is open to all undergraduate students. Representatives participate in intercollegiate competition with major colleges and universities from the entire United States. Membership in the Maine Debating Council and Pi Kappa Delta may be obtained through participation in forensic activites.

Radio and Television—Students from the entire University have an opportunity, through working on stations WMEB-FM and WMEB-TV, to participate in all phases of radio and television broadcasting. With studios in 275 Stevens Hall, WMEB-FM is operated with a faculty manager and student staff as an integral part of the academic and co-curricular program of the School of Performing Arts. WMEB-TV, operated by the Maine Public Broadcasting Network, has studios in Alumni Hall. The varied program enables the student to gain valuable experiences in engineering, programming, announcing and writing.

Student Publications—The University's regular student publications are:
The Maine Campus, a newspaper published daily.
The Prism, an illustrated annual.
Maine Review, a literary magazine published semi-annually.
The Student Publication Committee, a joint faculty-student group, is the publishing board for all the University's student publications.

Social Fraternities and Sororities—The following fraternities and sororities have chapters at the University. The figures in parentheses are the dates they were established.

Fraternities—National: Beta Theta Pi (1879). Alpha Tau Omega (1891), Phi Kappa Sigma (1898), Phi Gamma Delta (1899), Sigma Alpha Epsilon (1901), Sigma Chi (1902), Theta Chi (1907), Delta Tau Delta (1908), Lambda Chi Alpha (1913), Sigma Nu (1913), Alpha Gamma Rho (1924) Tau Epsilon Pi (1929), Sigma Phi Epsilon (1948), Tau Kappa Epsilon (1948), Delta Upsilon (1970). Local Phi Eta Kappa (1906).

Sororities—National: Alpha Omicron Pi (1908), Phi Mu (1912), Delta Delta Delta (1917), Pi Beta Phi (1920), Chi Omega (1921), Delta Zeta (1924), Alpha Chi Omega (1958), Alpha Phi (1963), Alpha Delta Pi (1968), Sigma Kappa (1968).

Admission

All correspondence concerning undergraduate admission at the Orono campus should be addressed to the Director of Admissions, Alumni Hall, University of Maine, Orono, Maine 04469.

Applicants interested in the Bangor Community College of UMO should write directly to the Associate Director of Admissions, Bangor Community College, Bangor, Maine 04401. (See section on Bangor Community College for programs and admission requirements.)

Applicants for admission to the Graduate Division should write to the Dean of the Graduate School, Winslow Hall, University of Maine, Orono, Maine 04469.

A Social Security number is requested of all U.S. applicants. Foreign students will be assigned a similar number.

ADMISSION TO THE FRESHMAN CLASS—ORONO

The approval of candidates for admission is on a selective basis. The University is interested in candidates whose preparatory program, scholastic achievement, aptitudes, interests, character, and established study habits give definite promise of success in a senior college program. The University admits men and women, both residents of Maine and nonresidents; it reserves the right to terminate admissions whenever the capacity of the University to care properly for the students has been reached.

The candidate is required to submit a carefully answered questionnaire concerning favorite studies, school activities, community interests, hobbies, choice of college course and other matters bearing upon preparation for a college program. This information is required so that the University may better guide the student in selecting courses of study best suited to one's individual abilities, aptitudes, and interests.

All four-year degree candidates are required to submit the scores on the College Entrance Examination Board Scholastic Aptitude Test (S.A.T.), and the scores on at least two C.E.E.B. Achievement Tests. (For details, see section concerning the C.E.E.B. which follows.)

Candidates for admission to the freshman class should file their applications in the fall of the year prior to the date they plan to begin their studies.

The required application forms (which are revised each summer) may be obtained by writing to the Director of Admissions on or after Sept. 15. Application forms are also available in Maine high school guidance offices. A *nonrefundable application fee of $10 is required of all applicants.* Applicants must apply for admission prior to March 1 for equal consideration with other candidates. Applications received after this date will be marked "Late" and considered only as classroom and dormitory capacities allow.

Candidates for the freshman class normally are accepted for the opening of the academic year in September. The priority of the housing assignment is based primarily on the date of formal acceptance by the Committee on Admissions. *Certificates of admission issued prior to the completion of the current school year may be rescinded if the final report in June is unsatisfactory.*

SCHOLASTIC APTITUDE AND ACHIEVEMENT TESTS

All candidates for admission to four-year degree programs and the associate degree programs in Engineering Technology at the Orono campus are required to take the Scholastic Aptitude Test (S.A.T.) and at least two Achievement Tests administered by the College Entrance Examination Board. Candidates are urged to take the November, December and/or January tests. The Achievement Tests should include English composition, (Level I Mathematics is also required of all engineering candidates) and at least one other test of the candidates' choice, or as recommended by the Director of Admissions. Veterans need only take the Scholastic Aptitude Test (S.A.T.)

Candidates for the two-year technical programs in the College of Life Sciences and Agriculture (Orono) are required to take the Scholastic Aptitude Test only.

High school juniors are encouraged to take achievement tests in *non-continuing subjects* on the May testing date. Guidance counselors should be consulted prior to registering for such tests.

Arrangements to take the C.E.E.B. Tests should be made by writing to the College Entrance Examination Board, P.O. Box 592, Princeton, New Jersey, for application forms and infor-

mation. *Arrangements must be made at least one month before the testing date.* Application forms and information may be obtained from high school guidance counselors.

The College Entrance Examination Board will administer tests on each of the following dates.

Note: Either the S.A.T. or Achievement tests may be taken only on the *mornings* indicated.
Saturday, November 1, 1980 (SAT or ACH)
Saturday, December 6, 1980 (SAT or ACH)
Saturday, January 24, 1981 (SAT or ACH)
Saturday, April 4, 1981 (SAT or ACH)
Saturday, May 2, 1981 (SAT or ACH)
Saturday, June 6, 1981 (SAT or ACH)
Official test reports from the Education Testing Service are required.

ADVANCED PLACEMENT

In certain subjects, candidates who have completed advanced work in secondary schools may apply for advanced placement and credit at the University of Maine. Candidates interested in advanced placement and credit must take one or more of the Advanced Placement Tests or the C.L.E.P. (College Level Examination Program) tests administered by the College Entrance Examination Board. Each case will be considered individually on its own merits.

Information concerning our C.L.E.P. policies may be obtained from the Admissions Office.

Candidates who have had training and/or experience in certain professional or semi-professional fields may apply for advanced placement and credit at the University of Maine at Orono. Candidates interested in such placement and credit may take either appropriate standardized tests, such as those prepared by the College Entrance Examination Board (College Level Examination Program—C.L.E.P.), or examinations especially developed by the academic unit concerned.

VETERANS ADMINISTRATION INFORMATION

The University is prepared to help servicemen or women and children of deceased veterans with their educational plans. Requests for information concerning veterans' educational privileges should be forwarded to the Registrar's Office, Wingate Hall, University of Maine, Orono, Maine 04469. Correspondence should be marked "Veterans Information."

Former students of the university as well as prospective students should submit their application for admission to the Director of Admissions. Application for a certificate of eligibility should be made at a Regional V.A. Office

FINANCIAL AID AND SCHOLARSHIPS

Applications for financial grants, loans under the National Direct Education Loan Plan, for participation in the Work-Study Program under the Economic Opportunity Act of 1964, and assistance under the Higher Education Act of 1965 may be obtained from the Office of Student Aid, Wingate Hall. Parents or legal guardians of all applicants for financial aid are required to file a Financial Aid Form (F.A.F.) with the College Scholarship Service. Forms and information are available in each local high school. Requests for aid will be reviewed by the committee after the applicant has been formally notified of acceptance by the Director of Admissions. The University financial aid form should be filed before March 1, and preferably at the time the admission application is filed.

The University participates in the College Scholarship Service (CSS) of the College Entrance Examination Board. Participants in CSS subscribe to the principle that the amount of financial aid granted a student should be based upon financial need. The CSS assists colleges and universities and other agencies in determining the student's need for financial assistance. Entering students seeking financial assistance are required to submit a copy of the Financial Aid Form (F.A.F.) to the College Scholarship Service, designating the University of Maine at Orono as one of the recipients. The F.A.F. may be obtained from a secondary school or the College Scholarship Service, P.O. Box 176, Princeton, New Jersey 08540 or P.O. Box 1025, Berkeley, California 94704.

Upperclass students may apply annually during designated periods for all types of financial assistance. Applications and F.A.F. forms are available at the Office of Student Aid.

Part-time work opportunities, both on-campus and off-campus, are available to students. From applications filed each year, the Office of Student Aid refers students to suitable job

openings as they are received. A satisfactory academic standing must be maintaining during the working period.

A specially prepared brochure entitled Financial Aid is available from the Director of Student Aid upon request. Detailed descriptions of all types of financial aid programs are included.

MINIMUM REQUIREMENTS FOR ADMISSION
COLLEGE OF ARTS AND SCIENCES

English	4 units
Foreign Language	2 units in one language
Algebra	2 units
Plane Geometry	1 unit
History or Social Science	1 unit
Science	1 unit
Electives†	6 units
Total	17 units

†Chemistry is recommended as an elective for Science, Medical Technology and similar curricula, and required for pre-nursing.

†½ unit in Trigonometry is recommended for students who plan to major in Mathematics or Science.

COLLEGE OF BUSINESS ADMINISTRATION

English	4 units
Algebra	2 units
Plane Geometry	1 unit
History or Social Science	1 unit
Electives	8 units
Total	16 units

COLLEGE OF EDUCATION

(Includes curriculum in Physical Education)

English	4 units
Three units from one and two units from another of the following: (Foreign Languages) (Mathematics) (Natural Sciences) (Social Studies)	5 units
Electives	7 units
Total	16 units

United States History, Natural Sciences, and two units of Mathematics are recommended. Algebra I and II and Plane Geometry are required of those students who wish to prepare for teaching mathematics or science.

COLLEGE OF LIFE SCIENCES AND AGRICULTURE

I. Animal Sciences, Plant and Soil Sciences, Agricultural and Resource Economics, Agricultural Engineering, Agricultural Mechanization, Biological Sciences, School of Forest Resources.

English	4 units
Algebra	2 units
Plane Geometry	1 unit
Trigonometry (Agric. Engineering only)	½ unit or its equivalent
Science	2 units (one of which must be chemistry or physics)
History or Social Science	1 unit
Electives	5½-6 units
Total	16 units

II. School of Human Development:

English	4 units
Mathematics*	2 units (at least 1 yr. of algebra)
Science*	1 unit (chemistry preferred)
History or Social Sciences	1 unit
Electives	8 units
Total	16 units

*Algebra 1,2, plane geometry and chemistry required for majors in Food and Nutrition, Health and Family Life Education, and Home Economics Education.

III. Technical Division (Associate Degree Programs): Candidates for admission to the Technical Division Programs in Life Sciences and Agriculture must have graduated from high school and must complete the C.E.E.B. Scholastic Aptitude Tests (C.E.E.B. Achievement Tests are not required). A student should have two units of high school mathematics, one of which must be algebra. Candidates for the programs Agricultural Mechanization (two-plus-two) and Forest Management Technology should have completed Algebra 1 and 2 and Plane Geometry. One unit of physics is strongly recommended for Agricultural Mechanization students. Students who contemplate continuation in a regular four-year baccalaureate degree curriculum must first complete the two-year associate degree program at a grade average of 2.50 or higher, and must satisfy entrance requirements to the desired baccalaureate degree program.

COLLEGE OF ENGINEERING & SCIENCE

I.

English	4 units
Foreign Languages	(Two or more units in one language recommended but not required)
Algebra	2 units
Trigonometry	½ unit or its equivalent (not required for two-year engineering technology programs—See below)
Plane Geometry	1 unit
Chemistry or Physics	1 unit (both recommended)
History or Social Science	1 unit
Electives	6½-7 units
Total	16 units

In addition to these course requirements, applicants must further qualify themselves by satisfactory performance on the Level I Mathematics Achievement Test administered by the College Entrance Examination Board.

II. School of Engineering Technology (Orono campus only):
Candidates for admission to one of the Engineering Technology Programs must have completed the same courses as required of the four-year B.S. degree candidates with the exception of trigonometry. Also, candidates are required to complete the C.E.E.B. Scholastic Aptitude Test and two Achievement Tests (English Composition, and Level-I-Math.).

ADMISSION TO THE CONTINUING EDUCATION COURSES

The University of Maine has undertaken a broadened program of adult education at various locations throughout Maine. This program includes credit courses, non-credit courses, short, and conferences as appropriate.

The categories of admission under the programs in Continuing Education are:

1. Degree Program Admission—Regular admission requirements are in effect for both undergraduate and graduate degree applicants. Applications should be filed with the Director of Admissions (undergraduate degree status) or with the Dean of the Graduate Division.
2. Special Students—Special students are those who have not made formal application for degree status but are interested in registering for courses through the Continuing Educa-

tion Division (C.E.D.). These students must satisfy prerequisites for any course in which they enroll.

Many special students have the long range objective of earning a baccalaureate degree. Others have short range objectives and enroll in courses that offer vocational or cultural interests.

Students planning a degree program are required to arrange an appointment with a C.E.D. administrator to formulate future academic plans. Students whose objectives are more short ranged are strongly urged to arrange an appointment at the C.E.D. office.

Information and application forms may be obtained by writing the Director, Continuing Education, Merrill Hall, University of Maine, Orono, Maine 04469.

FORMER STUDENTS

Former students who desire to return to the Orono campus must file an early application (at least six weeks prior to the opening of classes) for readmission with the Director of Admissions. The applicant must arrange for official transcripts and catalogs to be forwarded to the Director of Admissions from all schools and colleges attended since leaving the University. A readmission application form may be obtained from the Admissions Office.

The request for readmission by a former student is reviewed and acted upon by the Academic Standing Committee in the College to which the student has applied.

ADMISSION BY TRANSFER

The admission of transfer students is necessarily carefully controlled. Admission is on a selective basis.

A student desiring to transfer to the University of Maine at Orono from another college of recognized standing must file application with the Director of Admissions at least five months before the opening of the semester. This request must include a statement of the names and addresses of all school and colleges attended as well as information indicating the desired curriculum.

The application must arrange for official transcripts and catalogs to be forwarded from all previously attended junior colleges, colleges, and universities to the Director of Admissions, University of Maine, Orono, Maine 04469.

The evaluation of transcripts of academic work completed at institutions previously attended must be accepted as final at the time of enrollment.

ADMISSION OF SPECIAL AND SHORT COURSE STUDENTS

In exceptional cases, and when space permits, a mature person who presents satisfactory evidence of ability to benefit from work of a special college program may be admitted to the university as a special student. Such students are not candidates for degrees but will be registered in the college where the principal courses in their program are taught. Application forms may be obtained from the Director of Admissions.

NEW ENGLAND REGIONAL COOPERATION

New England's state universities and colleges are working together to increase the number and variety of educational opportunities for the young people of the region. Under this cooperative program, qualified New England residents are given preferred admission at other state institutions in certain specialized programs not available in their own states. Students accepted in these programs are also granted the benefit of tuition and fees which are considerably lower than those usually charged out-of-state students. This plan makes available to the residents of the region a wider variety of programs at low cost—without additional funds being spent to duplicate specialized staff and expensive facilities in each state.

Each college or university has designated which of its programs are to be offered on a regional basis and maintains control over its own courses and programs.

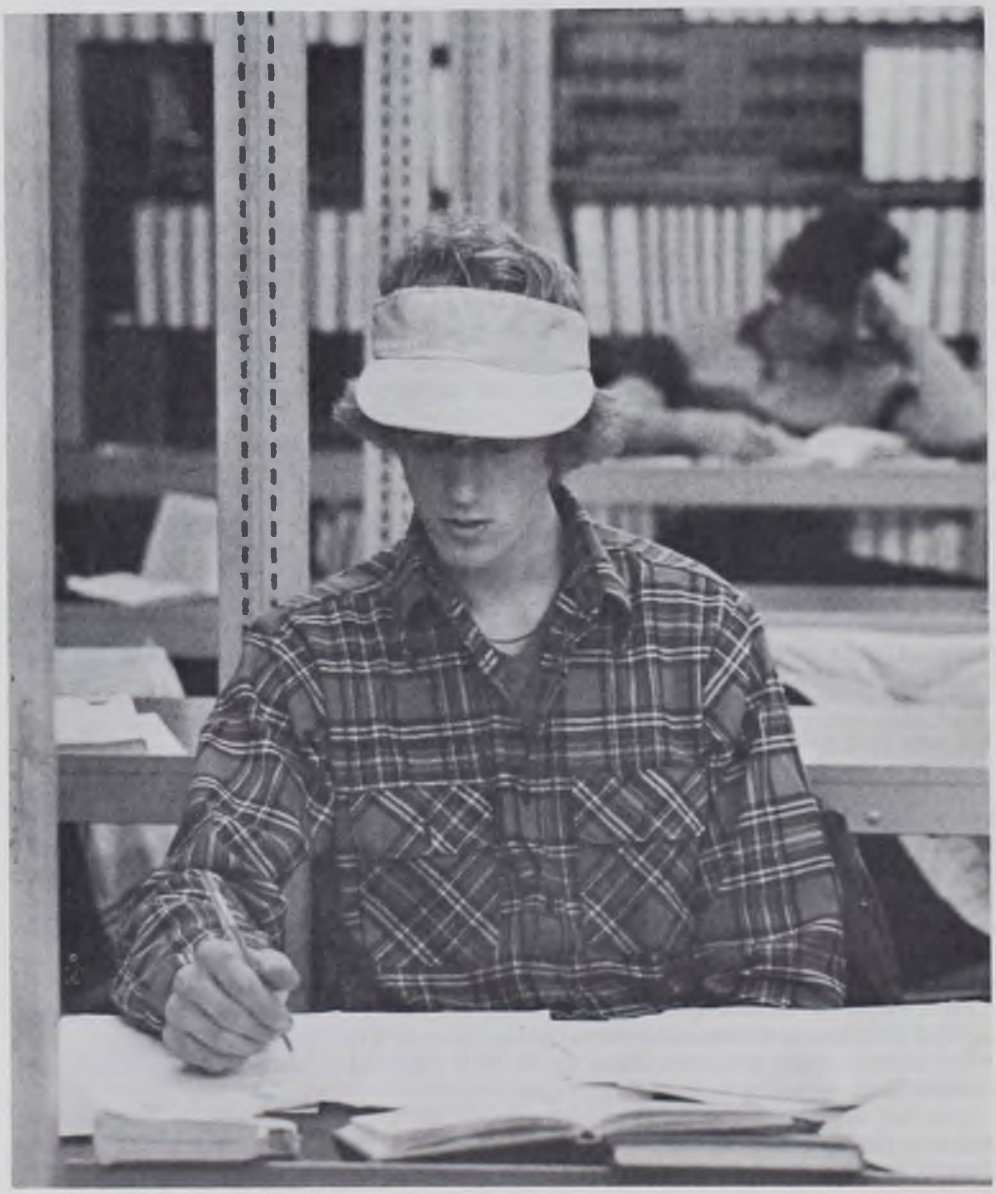
The undergraduate programs begin at the freshman level. Other regional programs are available at the graduate level or for certain professional curricula.

Information may be obtained from high school guidance officials, from the New England Board of Higher Education, 68 Walnut Road, Wenham, Mass. 01984; or by writing to the Director of Admissions at any one of the New England state universities or colleges.

ACCREDITATION

The University of Maine at Orono is accredited by the New England Association of Schools and Colleges. In addition, many of the University of Maine at Orono's professional programs and departments are accredited by national professional associations, including:

The Commission on Accreditation of Dental Auxiliary Education Programs, American Dental Association
American Assembly of Collegiate Schools of Business
AMA Council on Medical Education
National Association of Schools of Music
National League of Nursing
American Psychological Association
Engineers' Council for Professional Development
American Chemical Society
National Council for Accreditation of Teacher Education
American Dietetic Association
Society of American Foresters



Financial Information

General Information

All charges are payable in full prior to the first day of classes for each semester. After that, a $25.00 late registration fee will be assessed. All accounts are carried in the name of the students. Invoices and statements are mailed to the student and not the parent.

The University expects the student to be financially responsible and not delinquent in his/her financial obligations to the University. Students in a delinquent status shall not be allowed to register for future courses and transcripts for past study will be withheld until such time as all financial obligations to the University have been satisfied.

The financial requirements of the University, changing costs, state and legislative action and other matters may require an adjustment of these charges and expenses. The University reserves the right to make such adjustments to the estimated charges and expenses as may from time to time be necessary in the opinion of the Board of Trustees up to the date of final registration for a given academic term. The applicant acknowledges this reservation by the submission of an application or by registration.

Invoices and Statements

Invoices are mailed from the Business Office approximately 45 days prior to the beginning of each semester for pre-registered students. Students not pre-registered must come to the Business Office after registration, at which time an invoice will be presented. Any pre-registered student not receiving an invoice prior to the start of classes must notify the Business Office prior to the start of classes in order to avoid the $25.00 late registration fee. Invoices and statements are mailed to the student.

Schedule of Expenses

APPLICATION FEE — A nonrefundable Application Fee must accompany each application $10.00

MATRICULATION FEE — A one-time fee for each student who elects to pursue a degree program $15.00

NEW STUDENT ORIENTATION FEE — All new students (freshmen and transfers) are charged a one-time orientation fee of $20.00. The fee is $30.05 if the student resides in a dormitory during the New Student Orientation Program.

TUITION—Undergraduate and Associate	Semester	Year
UMO—Baccalaureate - Maine Resident		
$37.00 per credit hr. 1 to 11 credit hours; 12 or more credit hours will be charged the full rate of	$ 540.00	$ 1,080.00
UMO—Baccalaureate - Non-Resident		
$102.00 per credit hr. to a maximum per semester of	$ 1,450.00	$ 2,900.00
UMO-BCC—Associate - Maine Resident		
$37.00 per credit hr. 1 to 11 credit hours; 12 or more credit hours will be charged the full rate of	$ 490.00	$ 980.00
UMO-BCC—Associate - Non-Resident		
$102.00 per credit hr. 1 to 11 credit hours; 12 or more credit hours will be charged the full rate of	$ 1,450.00	$ 2,900.00

1. Non-Resident students enrolled under the New England Board of Higher Education Exchange Program are billed at 25% above the Maine Resident rate.
2. All students billed for less than the maximum tuition per semester are charged a $5.00 per semester registration fee.

ROOM AND BOARD	Semester	Year
Regular Residence Halls		
21-meal plan	$ 1,077.50	$ 2,155.00
14-meal plan	1,047.50	2,095.00
Hannibal Hamlin and Chadbourne Basement Residence Halls		
21-meal plan	1,027.50	2,055.00
14-meal plan	997.50	1,995.00
Bangor Community College Residence Halls		
21-meal plan	1,050.00	2,100.00
14-meal plan	1,020.00	2,040.00
Cabins—Cooperative Housing (Room Only)	320.00	640.00
Colvin—Cooperative Housing (Room and Board)	802.50	1,605.00
York Village (Room Only)	485.00	970.00

Commuter and York Village Meal Plans

Semester rate 5 meal plan — $151.00 (any 5 lunches)
10 meal plan — 322.00 (lunch & dinner: Mon.-Fri.)
14 meal plan — 537.50 (any 14 meals; 7 days a week)
21 meal plan — 567.50 (all 21 meals; 7 days a week)

STUDENT FEE (compulsory)
A student fee of $12.50 per semester is charged all UMO students registered for six credit hours or more. A student fee of $20.00 per semester is charged all BCC students for 6 credit hours or more. UMO students residing at BCC will be charged the $20.00 per semester fee. This student fee is compulsory and all proceeds go directly to the Student Government of the respective campus.

YEARBOOK (Optional)
Students choosing to buy a yearbook will be billed for the cost of the yearbook on the Spring Semester invoice.

STUDENT HEALTH AND INSURANCE FEE (Optional)
The combination of the student health fee and student insurance is the student's best way to avoid heavy medical expenses that might threaten his/her academic career. The combination fee ($32.00 per year Health Fee; $39.00 Insurance Fee) is billed to all students registered for six (6) credit hours or more. The fee may be deleted from the invoice if the student does not desire this type of health coverage.

LATE REGISTRATION FEE
A late registration fee of $25.00 is charged all students not pre-registered for classes by the registration deadline. The late registration fee is also charged to those not paying their semester charges prior to the first day of classes.

BOOKS AND SUPPLIES
The cost of books and supplies varies according to the course for which a student is registered. Charges for books and supplies are not billed on the semester invoice. They must be paid directly to the University Bookstore at the time books and supplies are purchased.

LABORATORY FEES
Course fees are charged in several courses. These fees vary. The amounts are listed in the Schedule of Classes. The invoices for Laboratory Fees are mailed to the student approximately five (5) weeks after the beginning of each semester. Course fees for courses dropped after the fifth week are still due and payable.

APPLIED MUSIC FEES
The fees for students registered in Applied Courses in Music are indicated in the Music section of the catalog. These will be billed after the beginning of the semester.

Deposits

Freshmen and Transfers—Tuition and Room
A deposit of $50.00 is due when the applicant is notified of acceptance by the Director of Admissions. If a residence hall is required, an additional $50.00 is due. These deposits will be applied toward the student's account when he/she registers.

If a freshman, transfer or readmission applicant notifies the Director of Admissions of withdrawal prior to June 1, the deposits will be refunded. The deposits are forfeited if the student withdraws after June 1.

Upperclass—Room
All upperclass students desiring to live in a residence hall must pay a room deposit of $50.00 in the spring in order to sign up for rooms for the fall semester. This deposit will be deducted from the fall semester bill. If it is found that residence hall accommodations are not desired, the deposit will be refunded provided the Residential Life Office is notified by July 12. If notice is not given by that date, the deposit will be forfeited. Deposits will not be accepted until all prior financial obligations to the University have been paid.

Refunds

Students leaving the University before the end of a semester may be eligible for a refund.

1. **Tuition**
   Tuition will be refunded according to the scale and provisions set forth below for students withdrawing during the first four (4) weeks of a term.
   a. Scale—The period of attendance is counted from the first day of classes and includes weekends and holidays. The refund will be calculated as of the date the student notifies the Registrar of withdrawal.

	Refund Percentage
1st week	100%
2nd week	75%
3th week	50%
4th week	25%
over 4th week	0%

   b. Provisions
      (1) A student enrolled in a full-time program who drops or adds a course and continues to be charged maximum tuition will have no financial adjustments of tuition.
      (2) In no case will tuition be reduced or refunded because of voluntary absence from classes.
      (3) Tuition adjustments attributable to involuntary absence, e.g., extended illness and military service, will be processed on a case by case basis.
2. **Fees**—University fees are not refunded.
3. **Room and Board**
   Room and board refunds are made in accordance with the Residence and Dining contract, clauses 8, 9, 10 and 11. The contract must be signed by each student living in a residence hall.
   No refund will be made for withdrawals made 14 days prior to the end of a semester.

Installment Plan

Students and parents who prefer to pay their educational costs on an installment basis may do so. The University has made arrangements with Academic Management Services, Inc. for the following plan which may be use by both student and parent. An application for the installment plan must be obtained from the Business Office, Alumni Hall. The application and a $35.00 participation fee (non-refundable) is to be mailed to AMS, 1110 Central Avenue, Pawtucket, RI 02861, on or before June 1. AMS will bill the parent or student in ten (10) equal installments for the total yearly cost of education at the University. The total cost of this plan is $35.00 per year. There are no other costs.

Rules Governing Residency

Original Classification:

A student is classified as a resident or a non-resident for tuition purposes at the time of admission to the University. The decision, made by the appropriate campus Director of Budget, is based upon information furnished by the student's application and any other relevant information. No student once having registered as an out-of-state student is eligible for resident classification in the University, or in any college thereof, unless he or she has a bona fide domiciliary of the state for at least a year immediately prior to registration for the term for which resident status is claimed. This requirement does not prejudice the right of a student admitted on a non-resident basis to be placed thereafter on a resident basis provided he or she has acquired a bona fide domicile of a year's duration within the state.

Change of Classification

For University purposes, a student does not acquire a domicile in Maine until he or she has been here for at least one year primarily as a permanent resident and not merely as a student. If

the student is enrolled for a full academic program, as defined by the University, it will be presumed that the student is in Maine for educational purposes and the burden will be on the student to prove otherwise. In general, members of the Armed Forces and their dependents are normally granted in-state tuition rates during the period when they are on active duty within the State of Maine.

Subject to the provisions of the preceding paragraph, the domicile of an unmarried minor follows that of the parents or legally appointed guardian. The bona fide year round domicile of the father, if living, otherwise that of the mother, is the domicile of such a minor, but if the father and the mother have separate places of residence, the minor takes the domicile of the parent with whom he lives or to whom he has been assigned by court order. If neither of the parents are living, the unmarried minor takes the domicile of his legally appointed guardian.

Subject to the provisions of the first paragraph, an adult student, defined for the purposes of these rules is one who is either married or 18 years of age or older, will be classified as a resident of Maine if he or she has completed 12 consecutive months of domicile in Maine immediately preceding registration for the term for which residents status is claimed.

Subject to the provisions of the first paragraph, if a non-resident student has a spouse who has a residence in Maine, the student shall be deemed to have a residence in Maine.

Appeal Procedure

To change resident status, the following procedures are to be followed:

A. Submit a "Request for change of Residence Status" form to the Director of Budget. If the Director of Budget's decision is considered incorrect

B. The student may appeal the Director of Budget's decision in the following order:
   1. Vice President for Finance and Administration — where applicable.
   2. President.
   3. Treasurer—University of Maine, Chancellor's Office. (This decision must be considered final.)

In the event that the campus Director of Budget possesses facts or information indicating a change of status from resident to non-resident, the student shall be informed in writing of the change in status and will be given an opportunity to present facts in opposition to the change. The student may appeal the Director of Budget decision as set forth in the preceding paragraph.

No application will be considered for change after September 1 for the fall semester and January 1 for the spring semester.

All changes approved during a semester will be effective for the beginning of the next semester; none are retroactive.

In all cases the University reserves the right to make the final decision as to the resident status for tuition purposes.

Collegiate Descriptions

The following pages, under separate college headings, contain descriptive material for each college, its admission requirements, programs offered, and detailed descriptions of all undergraduate courses for both the associate and baccalaureate degrees.

Some departments have also included graduate level courses. However, for a complete description of the Graduate School, its organization, degrees offered, regulations, and detailed course descriptions, see the current catalog of the Graduate School.

Those desiring information about course offerings through the Continuing Education Division and Summer Session should request current publications from these offices in Merrill Hall.

Some students' permanent academic records will show courses with the symbol IDL. This signifies an ***Interdepartmental Listing*** of courses sponsored by more than one academic department. For example, in the following list of such courses, ***IDL 24—Sociology of Rural Life*** and under ***Agriculture and Resource Economics*** as ***IDL 24***.

Registration Symbol	Departments Listing the Course
8IDL - Meat and Meat Products	FS, AnV
IDL 11 - Aquaculture	Oc, AnV, AE, Ec
IDL 19 - Introduction to Ecology	Fy, En
IDL 24 - Sociology of Rural Life	ARE, Ay
IDL 33 - Introduction to Engineering	ChE
IDL 43 - Tropical Agriculture	P, AnV
IDL 50 - Forum on Food	FS, Ay, HD, Bc, Ch, Mb, ARE
IDL 65 - Meat Technology	AnV, FS
IDL 105 - Women of Maine	Ay, Hy, Sc
IDL 106 - Photogrammetry	CE, Fy
IDL 110 - Introduction to the Study of Linguistics	Ay, Eh, FL
IDL 114 - Women in Society	Ay, Hy, Py
IDL 119 - General Ecology	Zo, Bt
IDL 120 - Ecology Lab and Field Course	Fy, Bt, Zo
IDL 124 - Contemporary Rural Problems	ARE, Sy
IDL 129 - The Individual and the Community	ARE, Sy
IDL 130 - Polymer Chemistry and Reaction Engineering	ChE, Ch
IDL 131 - Polymer Structure and Properties	ChE, Ch
IDL 138 - Food Microbiology	FS, Mb
IDL 140 - Seminar in Quaternary Studies	Gy, Ay, Bt, P, Zo
IDL 150 - Optical Communications	EE, Ps
IDL 157 - Biophysics	Ps, Bc
IDL 158 - Culture and Economic Development	Ec, Ay
IDL 161 - Park Planning and Design	ARE, P
IDL 162 - Recreation and Park Management	Fy, ARE
IDL 170 - Introduction to Oceanography	Oc, Zo
IDL 173 - Forest Roads and Structures	AE, Fy
IDL 174 - Forest Power and Machinery	AE, Fy
IDL 175 - Field Studies in Ecology	Bt, En, Fy, Oc, Zo
IDL 176 - School and Society Study Tour	HD, Ed
IDL 185 - Computer Hardware Theory	Ms, EE
IDL 198 - Undergraduate Research Participation	EE, Ps, Ch, Ms
IDL 200 - Seminar in Quaternary Studies	Gy, Bt, Ay, Oc, S, Zo
IDL 201 - Biological Oceanography	Oc, Zo
IDL 208 - Anatomy and Classification of Fishes	Oc, Zo
IDL 209 - Molluscan Fisheries Biology	Oc, Zo
IDL 210 - Marine Invertebrate Zoology	Oc, Zo
IDL 211 - Larval Biology of Marine Invertebrates	Oc, Zo
IDL 225 - Mathematical Economic Techniques	ARE, Ec
IDL 230 - Econometrics	Ec, ARE
IDL 237 - The Evolution and Development of Canadian Government and Politics	Hy, Pol
IDL 239 - Ice Age and Mankind	Bt, Qs
IDL 245 - Late Quaternary Paleoecology	Bt, Gy

IDL 252 - Behavior Genetics	Zo, Py
IDL 260 - Marine Geology	Oc, Gy
IDL 263 - Marine Benthic Ecology	Bt, Oc, Zo
IDL 264 - Structure and Tectonics of the Ocean Sea Floor	Oc, Gy
IDL 266 - Micropaleontology	Oc, Gy
IDL 267 - Actuopaleontology	Oc, Gy
IDL 268 - Deep Sea Stratigraphy and Paleoceanography	Oc, Gy
IDL 275 - Late Quaternary Marine Paleoclimatology and Paleoceanography	Oc, Gy
IDL 340 - Ecology Seminar	Bt, En, Fy, Zo

ABBREVIATIONS AND SYMBOLS

ARE	Agricultural and Resource Economics
AE	Agricultural Engineering
AnV	Animal and Veterinary Sciences
As	Astronomy
At	Art
Ay	Anthropology
BA	Business Administration
Bc	Biochemistry
Bd	Broadcasting
Bio	Biology
Bt	Botany
CAN	Canadian American Studies
CD	Clothing and Design
CE	Civil Engineering
CF	Child Development and Family Relationships
Ch	Chemistry
ChE	Chemical Engineering
Cl	Classics
Cp	Comparative Literature
CS	Computer Science
Da	Dance
DAS	Dental Assisting
DHY	Dental Hygiene
DS	Developmental Studies
EC	Economics
Ed	Education
EE	Electrical Engineering
Eh	English
En	Entomology
ENG	English (BCC)
FN	Food and Nutrition
Fr	French
FS	Food Science
FSA	Freshman Seminar in Advising
FL	Foreign Languages
Fy	Forest Resources
GE	General Engineering
GEO	Geography
Gk	Greek
Gm	German
GS	Graduate Readings
Gy	Geological Sciences
HD	Human Development
HE	Home Economics
HM	Home Management and Housing
Hr	Honors
HSV	Human Services
HTY	History (BCC)
Hy	History
IDL	Interdepartmental Listing
IS	Independent Study
JB	Journalism/Broadcasting
Jr	Journalism
LES	Law Enforcement
LSA	General Life Sciences and Agriculture
Lt	Latin
Mb	Microbiology
Mc	Music
ME	Mechanical Engineering
MHE	Man and His Environment
Ms	Mathematics
MST	Mathematics (SET, TDL)
Mt	Military
MTH	Mathematics (BCC)
MUS	Music (BCC)
My	Modern Society
NSG	Nursing
Oc	Oceanography
ON	Onward
P	Plants
Pa	Pulp and Paper Technology
PE	Physical Education
Pl	Philosophy
Ps	Physics
Pol	Political Science
PSY	Psychology (BCC)
Py	Psychology
QS	Quaternary Studies
RTV	Radio and Television
RE	Recreation Education
Ru	Russian
S	Soils
SET	School of Engineering Technology
SC	Speech Communication
SCI	Science
SOC	Social Science (BCC)
SS	Special Seminar
Sp	Spanish
SPA	School of Performing Arts
Sv	Surveying
SW	Social Welfare
Sy	Sociology
TDL	Technical Division of Life Sciences
Th	Theatre
Zo	Zoology

College of Arts and Sciences

Karl E. Webb, Dean

The College of Arts and Sciences is fundamentally dedicated to two major goals: (1) to provide a fine education in the liberal arts; and (2) to impart the specific knowledge and skills required for careers in one of its many representative disciplines. Those goals are met by the general requirements of the College and by the specialized opportunities incorporated in each major, the interdisciplinary concentrations, and the double-major options. Through the intensive study of human society and our heritage, of the physical world and the human spirit, students in the College are better able to understand and evaluate their surroundings, are more capable of identifying the scope and the resolution of the problems which confront them, and become more enlightened and more effective citizens. In addition, the understanding of the natural sciences, mathematics, the social sciences, the humanities and the fine arts they receive provides them with the background for a more enriched and productive life.

Major programs offered by the departments in the College of Arts and Sciences lead to the four-year degree of Bachelor of Arts in the following fields of academic study:

Anthropology
Art
Biology
Chemistry
Computer Science
Economics
English
French
Geological Sciences
German
History
International Affairs
Journalism/Broadcasting
Latin
Mathematics
Medical Technology
Modern Languages
Performing Arts (Music, and Theatre)
Philosophy
Physics and Astronomy
Political Science
Psychology
Public Management
Romance Languages
Sociology
Spanish
Speech Communication
Zoology

GENERAL INFORMATION

Admission—The specific requirements for admission are given in full in the Admission section. All deficiencies in entrance requirements must be made up before registering for the junior year. Students who transfer from other colleges with advanced standing must satisfy all admissions requirements *within a year*. Note: For admission to the College of Arts and Sciences *two years* of the *same* high school foreign language are required. Students who have *not* fulfilled this entrance requirement *must* take two semesters (6 hours) of a foreign language here for *no credit*.

Transfer Credit—No transfer credit will be allowed for courses taken at another institution in which grades below C have been received. Evaluation of courses taken at another accredited institution for which transfer credit is asked rests with the Director of Admissions and the Dean of the College.

Graduation Requirements—The work of the College of Arts and Sciences leads to the degree of bachelor of arts (B.A.) and the bachelor of music. All students are required to complete a minimum of 120 degree hours.

In addition, a 2.0 average in courses offered in fulfillment of the major requirements as well as an overall average of 2.0 is required. All requirements must be satisfactorily completed before the faculty of the college will vote on granting the student a B.A. degree. In computing averages, each hour of A is multiplied by 4, B by 3, C by 2, D by 1, and E by 0.

Special area requirements are listed in the section, Requirements.

Students who transfer to this college from another college of the University will normally need two full years of work in the College of Arts and Sciences to satisfy all specific requirements for the bachelor of arts degree. (All students must have a minimum of 30 degree hours of "Orono" courses).

The First Two years—During the first two years students in the College of Arts and Sciences take courses in selected fields. In order to assure a satisfactory level of attainment, some basic requirements will have to be fulfilled, including the successful completion of Eh 1, College Composition, which is designed to improve the student's writing skills.

Although the knowledge of an area in some depth (the major) is basic to a liberal education, students should not confine themselves to one particular area only. By the end of their college career, students should have been exposed not only to the required courses in the major but also to a broad range of subjects.

Since the exposure to a range of different disciplines requires more than a superficial knowledge, students will be required to take some work beyond the introductory level in areas other than the major. They will also have the opportunity to continue to explore disciplines through the survey courses. Interdisciplinary Concentrations are also available. See Index on Interdisciplinary Concentration and Course Clusters.

THE ARTS AND SCIENCES REQUIREMENTS

College Composition

Arts and Sciences freshmen will be allowed to demonstrate composition proficiency, thereby earning three English 1 credits, in a variety of ways. Students with average SAT scores will enroll in the one semester Eh 1 course and will receive credit when they have successfully fulfilled course objectives. Students with above average scores will write a diagnostic examination, on the basis of which some will receive course credit and others will be advised to enroll in either a shortened, seven-week version of the course or the traditional, semester-long course. Students with low scores will enroll in one of the tutorial divisions of the course and may need two semesters to earn course credit.

During the junior year, all Arts and Sciences students will have to demonstrate writing proficiency in their major.

Requirements

A. The Basic Requirements
   1. Each student must take courses (or demonstrate competency by evaluation) totaling *27 credit hours* in *two* of the General Areas identified.
   2. These *27 credit hours* may not be in courses which are in the *same* area as the student's *major area*.
   3. *A minimum of 11 credits* of the 27 must be taken in each area.
   4. *A minimum of 12 credits* of the 27 must be taken in courses *above* the survey introductory level.

B. Graduation Requirements leading to the degree of Bachelor of Arts (B.A.)
   1. Completion of a minimum of 120 degree hours with an accumulative grade point average of 2.0 ("C" average).
   2. Satisfactory work in written English throughout the college course.
   3. Completion of the three Basic Area Requirements listed below.
   4. *72 hours* of courses *outside* the major field are required.

The College is Divided into Three General Areas (Courses in the following departments will fulfill the requirement).

Area I, Social Sciences: Anthropology (Ay), Economics (Ec), Journalism (Jr), Broadcasting (Jb), Modern Society (My), Political Science (Pol), Psychology (Py), Speech Communication (SC), Sociology (Sy).

Area II, Humanities: Art (At), English (Eh), Foreign Languages and Literature (Fl), History (Hy), Philosophy (Pl), Performing Arts: Music (Mc), Theatre (Th), Freshman and Sophomore Honors (Hr).

Area III, Natural Sciences and Mathematics: Chemistry (Ch), Computer Science (Cs), Geological Sciences (Gy), Mathematics (Ms), Physics (Ps), Zoology (Zo).

(The Science Requirement may be fulfilled by some courses available in the College of Life Sciences and Agriculture. Information concerning these courses is available in the Student Information Center, Office of the Dean, Room 110, Stevens Hall.)

Academic Advising

Advising remains a commitment of the College to its students and represents the most important vehicle for implementing both the spirit and the letter of the College requirements.

Each student is assigned to a faculty member who will serve as academic adviser for the first two years of study.

Students register for *five courses* each semester; however, the actual number of credit hours carried in any one semester may range from 12-18. *Only* Dean's List students may register for six courses.

Normally not more than three hours may be taken in one subject in either semester of the freshman year, and not more than six hours may be taken in one subject in either semester of the sophomore year.

Freshman-Sophomore Advising (FSA)—Freshman Seminar (F.S.A.99) is an experimental course set up by the faculty adviser for the following purposes: (a) to bring freshmen and faculty into closer association at the very beginning of the student's university career in a small class situation, (b) to provide students in their freshman year with a better opportunity for intelligent decisions in determining their role in higher education, (c) to familiarize them with the many options available to them in making academic decisions, (d) to familiarize freshmen with the basic workings of a university through some of the literature in the area of higher education. There are no eligibility requirements for the student other than first semester standing in the College of Arts and Sciences. Since 45-55% of incoming freshmen are uncertain as to their directions, the Freshman Seminar is particularly beneficial to them.

The Last Two Years—On the completion of 53 degree hours, students, in conference with their adviser and with the approval of the dean, select their major subject. The department in which the major subject chiefly falls becomes for administrative purposes the student's major department, and the head of that department is responsible for the student and must approve the student's registration.

The major curriculum is the nucleus of related courses selected by the students as representing their chief field of interest or major subject. Normally much of the work will fall in one department. The minimum of credit hours acceptable for a major is set by the department. All students are required to take 120 hours of courses for graduation with at least *72 hours outside of the major.*

Selected students may take *advanced* courses in Military Science and Tactics during their junior and senior years, for which a *maximum of 10 credit hours* may be received.

Double Majors—Double majors are permitted between most disciplines in the College of Arts and Sciences. The requirements for meeting the double major state that a student must meet all requirements of the two separate and distinct disciplines.

Foreign Study—The college encourages students in good academic standing to spend a year (preferably the junior year) in study at selected foreign universities. Depending on the foreign institution attended and the type of courses taken, academic credit for such study will be determined by the dean and the head of the student's major department upon completion of the program. While evidence of satisfactory performance in the form of grades, certificates, etc., is required to obtain degree credit, such grades will *not* be used in computing the student's accumulative average at the University of Maine. For details students may consult the chairperson in the Department of Foreign Languages or Associate Professor Laura B. Luszczynska in the Department of Foreign Languages.

Honors Program—These tutorial courses encourage exceptional ability by affording special opportunities for its exercise and to reward high achievement with appropriate recognition. The program stimulates originality, intellectual curiosity, and resourcefulness, and demands a large measure of self reliance. Students do their work under the supervision of a tutor, whom they meet in conference at regular intervals for informal discussion and advice. The formal recognition, the highest offered in the College of Arts and Sciences, is conferred following a successful completion of the honors program, in the form of graduation honors of three grades: honors, high honors, highest honors.

Pass-Fail Option—Students enrolled in the College of Arts and Sciences who have achieved sophomore standing and who have an accumulative grade point average of 2.0 or better are eligible to take *one* course a semester on a Pass-Fail basis. However, courses which are required by the college and courses taken in one's major field or closely related fields may *not* be taken on a Pass-Fail basis.

A grade of D or better is graded as a Pass. Although Pass grades are not used in computing grade point averages, the credit thus earned is counted for degree credit.

The Pass-Fail option may be added, deleted, or changed from one course to another *only* during the *first week* of the Add-Drop period.

Pre-Law Advising—A comprehensive advising service is available for those students interested in attending law school upon graduation from the University. Recognizing that there is

no set pattern of undergraduate courses required by law schools, students will be encouraged to give attention to the "Statement on Prelegal Education" of the Association of American Law Schools which emphasizes the development of basic skills and insights, involving education for "comprehension and expression in words, critical understanding of the human institutions and values with which the law deals, and creative power in thinking." Students will be helped in the selection of courses, furnished information on careers in law, requirements of different law schools, the nature of the Law School Admission Test, when to take it and how to interpret results, and advised of the range of schools to which their records and scores might indicate successful application. Catalogs of a large number of law schools are available. A Pre-Law Society of students meets many times during the year. For further information contact Prof. Eugene A. Mawhinney, Pre-Law Adviser, 13B North Stevens Hall.

Premedical and Predental Curricula—Medical and dental colleges in general desire students who are not only well prepared in the sciences and mathematics but who are also broadly educated. To the first point they require certain courses in biology, chemistry, mathematics and physics; to the second they recommend a liberal background in the humanities and the social sciences.

In order to meet the minimum requirements of most medical and dental schools, students should plan, with the aid of their advisers, to include the following specific courses within the framework of their major program, all to be completed before the senior year.

Subject	Credit Hours
†Ch 11/12 General Chemistry	
or	
Ch 13/14 Chemical Principles	8
Ch 151/152 Organic Chemistry Lecture	6
Ch 161/162 Organic Chemistry Laboratory	4
Two semesters English Composition or Literature	6
Ps 1/2 or Ps 1a/2a General Physics	8
Bio 1 Basic Biology and Zo 4 Animal Biology	8

Most medical and dental schools will accept advanced placement in place of one or more of these subjects.

†Either Chemistry or Biology, or both, should be taken in the freshman year.

Many medical schools require or recommend certain additional courses.

Among those most commonly required or recommended are the following:

Calculus
Developmental Biology (Embryology)
Foreign Language (Intermediate level)
Physical Chemistry
Principles of Genetics
Quantitative Analysis

Although most premedical and predental students major in a science, they may major in any of the non-science departments according to their interests. The student would be advised, however, to take a program during the first two years that will allow the greatest possible freedom of choice in later selecting an undergraduate major. The freshman year specimen curricula given for majors in chemistry, physics, or zoology will leave many options open. Those who major in a non-science department and meet only the minimum science and mathematics requirements should achieve superior grades in order to demonstrate their proficiency in these critical subjects.

Students interested in medical and dental schools should register no later than their junior year with the Health Professions Committee, Chairman Frank L. Roberts, 100 Murray Hall. This committee provides liaison between the University and medically related professional schools and works closely with students during the application process. Applicants should take the appropriate admissions test during the spring semester of their junior year.

Students should be familiar with the admission policies of professional schools to which they plan to apply for admission. They must also meet the special requirements of the undergraduate college and department in which they wish to major.

Foreign Language—Several departments of the College of Arts and Sciences have special language requirements or recommendations:

ANTHROPOLOGY: Intermediate language proficiency.

CHEMISTRY: One year of either French, German, or Russian.

COMPUTER SCIENCE: The intermediate level of a foreign language is *strongly recommended.*
ENGLISH: Intermediate level of a foreign language; that is, the fourth semester or its equivalent.
GEOLOGY: Students contemplating graduate work are *strongly encouraged* to take either French, German, or Russian.
JOURNALISM: One year of a foreign language which can be either the continuation of the language taken in high school or a brand new language.
MATHEMATICS: The intermediate level of a foreign language is *strongly recommended.*
MUSIC: One year of a foreign language which can be either the continuation of the language taken in high school or a brand new language.
POLITICAL SCIENCE: Only in International Affairs.
PHYSICS: One year of a foreign language is recommended for the B.A. degree, two years for the M.A.
SOCIOLOGY: *Recommended* if going on to graduate school.
SPEECH COMMUNICATION: A six (6) hour sequence in foreign languages or linguistics.
ZOOLOGY: Proficiency at the intermediate level.

In addition, the humanities requirement of the College of Arts and Sciences may be fulfilled with a foreign language. Students who have presented two years of a high school foreign language for admission will *not* receive credit for an *elementary* course in that particular language unless five years have passed between the last language study and admission to undergraduate study. The Department recommends that these students take:

A. an intermediate or advanced course in the language in high school (credits earned in those courses count towards the advanced course credits in the humanities category).

OR

B. an elementary course in a new language (credits earned here count towards the introductory course credits in the humanities category).

Any language course (except for elementary courses in the student's high school foreign language) can, of course, be taken for credit as an elective.

Credits are awarded on a semester basis.

Finding the appropriate level at which to take a language course is essential for success.

During the first week of the fall semester the Foreign Language Placement Examination will be given to all freshmen in the College of Arts and Sciences for purposes of both placement and credit. If these students are planning to satisfy a portion of the humanities requirement by continuing a foreign language taken in high school, they must take the Language Placement Examination.

If a student wishes to start a new language, it will not be necessary to take the Placement Examination. However, if students decide at a later date to continue in a language already taken, they must take the Placement Examination, at their own expense, through the Testing Center.

How to receive credit by examination?

(1) If the score on the Placement Examination is sufficiently high (see following table) the student will receive three (3) hours of degree credit equivalent to the first semester of the intermediate course.

(2) As an incentive to continue language study, a student is eligible to receive an additional three (3) credit hours equivalent to the second semester of the intermediate course by skipping an intermediate course and passing with a grade of C or better *two* semesters of language study beyond the intermediate level. For example, a student who scores 580 on the French examination would receive three (3) credits equivalent to French 3. The student would then have the choice of taking French 4, or skipping French 4 and taking a course above the intermediate level, or any other advanced course. A student who completes, for example, a three-hour French course above the intermediate level with a C grade or better will receive an additional three (3) credit hours equivalent to French 4.

STUDENTS TAKING FRENCH 3 OR 4 FOR CREDIT CANNOT RECEIVE CREDIT FOR THESE COURSES BY EXAMINATION.

(3) The student who scores extremely high (see following table) will receive six (6) hours of credit equivalent to the intermediate course. It is highly recommended that these students continue to take advanced courses in the language for which they have demonstrated considerable proficiency.

The Foreign Languages and Classics Department accepts *Advanced Placement Examinations* in Foreign Language and Literature for degree credit. Scores of 4 and 5 on either examination will receive six credits; score of 3 will receive three credits.

Language Exam.	Score Range	
	3 Hrs. Credit	6 Hrs. Credit
French	550-670	680 and above
German	560-670	680 and above
Russian	560-690	700 and above
Spanish	550-710	720 and above
Latin	560-670	680 and above

Students who did not have two years of the same language in high school are admitted to the College of Arts and Sciences on a "CONDITIONAL" status. They are required to take two semesters (6 hours) of the same foreign language without degree credit to remove this "CONDITIONAL" status. Students are advised to make up this deficiency *During their first year at the University of Maine.*

Summer Session— Before students of the College of Arts and Sciences pursue Summer Session courses in any institution other than the University, they must secure the approval of the dean and the chairperson of the student's major department if they expect degree credit for such work. A marked bulletin of the institution should be left at the dean's office with a note requesting such credit for the courses selected.

Additional Programs

Modern Society — Modern Society (My 1.2) is an introductory and interdisciplinary course in social science designed to acquaint the student with some of the pivotal ideas in sociology, social psychology, economics and political science, and the contribution of such ideas to the understanding of human behavior. Lectures and discussion.

Informal meetings are held to discuss course-related materials and ideas that students may wish to explore beyond the limits of regular classroom lectures and discussions. Participation in such meetings is voluntary. Cr 3. Associate Professor Scontras (Chairman)

Medical Technology—This course is offered by the Zoology Department in the College of Arts and Sciences (Orono) in cooperation with the Eastern Maine Medical Center, Bangor, the Central Maine General Hospital, Lewiston, and the Maine Medical Center, Portland. Students electing this program (see Zoology) spend three years at the University of Maine, following which they undergo a period of 12 months in training at one of the above hospitals. Students receive the degree of bachelor of arts when they have satisfactorily completed the program. Those students who elect to attend the hospital in Lewiston or Portland for their 12 months in training will graduate at the regular time in May. Those electing the hospital in Bangor will graduate at the end of August. The work at the University also meets entrance requirements of other schools of medical technology which are not affiliated with the University of Maine. A special examination is given nationally, and a certificate in medical technology is issued when this examination is passed.

Public Management Curriculum—This program is designed to train men and women for governmental service in municipal and regional governments.

International Affairs—A major in International Affairs is available. The students may choose to concentrate in economics, foreign language, history, or political science. (See International Affairs in Index)

Bangor Theological Seminary—Regularly enrolled students in the College of Arts and Sciences may register for courses at the Bangor Theological Seminary, not to exceed six credit hours per semester, without payment of additional fees. The College of Arts and Sciences extends a like privilege to students regularly enrolled at the Bangor Theological Seminary. Such registrations must have the approval of the academic deans of both institutions and the instructors involved. Credit for courses so taken will be considered a part of the student's program at the institution where enrolled.

While enrolled at the Bangor Theological Seminary a student may, with the approval of the dean and the admissions office of the University, also register as a Special Student in the College of Arts and Sciences on the established fee basis for such courses. Work so taken, if it does not substitute for or duplicate courses taken in the Seminary program, may be counted as advanced standing credit toward the degree in the event a student later registers for a degree program at the University.

Professional Certificates for Teachers—Certification for secondary school teaching may be earned by students registered in the College of Arts and Sciences. Eighteen hours of basic work (Ed B2, Ed B3, Ed B4, one methods course and student teaching) meets the professional subject requirements for the General Secondary Provisional Certificate, which must be renewed after five years. Student teaching is required for full certification.

In addition to the 18 hours in professional courses, completion of a teaching major of 30 hours in one academic subject commonly taught in secondary schools is required. Candidates for a certificate are also expected to complete at least 18 hours in a second teaching field.

An alternate route to certification is possible by having 50 hours in a teaching area where at least three related academic subjects are represented.

Students planning on teacher certification should ascertain in advance whether their planned combination of major and minor areas is acceptable. It is recommended that students wishing to become certified should contact the College of Education early in their academic career. Information may be obtained in the dean's office either in the College of Arts and Sciences or in the College of Education.

University Affiliated Program (UAP)—A University Affiliated Program with the Department of Pediatrics at Eastern Maine Medical Center and the Colleges of Arts and Sciences, Education, and Life Sciences and Agriculture at the University of Maine at Orono is available to qualified undergraduate and graduate students. This program provides students with an opportunity to learn about developmental disabilities within an interdisciplinary context. The key features of the program are:

(1) a practicum experience with the Child Development Center, the Department of Pediatrics at Eastern Maine Medical Center or with one of the cooperating agencies;
(2) a series of seminars given by professionals who work with disabilities, such as: child development specialists, educational specialists, nutritionists, pediatricians, physical therapists, psychologists, psychiatrists, social workers and speech therapists.

Through these experiences students will develop an appreciation of the many factors affecting development. Students will develop special skills, but will also see how their own specialty can cooperate with other disciplines to provide the most beneficial treatment program for an individual.

Graduate students in Child Development, Human Nutrition, Psychology, Special Education, Speech Communication are eligible. Each graduate student will participate in an individually designed practicum specific to his or her discipline. Students will be selected on the basis of interest and background. In conjunction with the practicum, students will participate in an interdisciplinary seminar series.

Undergraduate students majoring in Art Education, Child Development, Human Nutrition, Psychology, Special Education, Sociology/Social Welfare, Physical Education are eligible. Students will be selected after having satisfactorily completed a sequence of basic courses in Developmental Disabilities and after having met specific department requirements for the UAP. Undergraduates would participate in a practicum and in an interdisciplinary seminar series. (See Interdisciplinary Concentration in Developmental Disabilities in Index.)

Interdisciplinary Concentrations—A series of "Course Clusters" (Interdisciplinary Concentrations) consist of courses which share a common focus. The courses in a cluster help the student to develop certain skills (for example, communications skills in Public Relations), or they might share a common theme (for example, the place of the environment in human experience).

The clusters are organized so that the student can move from introductory to more advanced courses within the concentration in a systematic manner.

Advisers are encouraged to recommend that their students take a group of courses within a concentration as a means of satisfying the Arts and Sciences generalization requirement of the College.

At any time during their undergraduate years, a student may declare an Interdisciplinary Course Concentration. Students should be encouraged to make this decision early enough to permit sound planning of their Interdisciplinary course sequence.

Some advantages of the program are to increase the student's knowledge in related areas of their interest thereby strengthening that major. In addition a course cluster may eliminate the smorgasbord of studies that students have taken in previous years, as well as improving a student's credentials for employment opportunities.

The cluster concept differs from the concept of the minor because it deals with an interdisciplinary area of concentration rather than courses in another discipline.

Interdisciplinary Program	Coordinator
Canadian Studies	Prof. Ronald Tallman, Canada House - 2222
Developmental Disabilities	Prof. Walter Harris, 306 Shibles - 2691
Environmental Issues and Ecological Studies	Prof. Edward Schriver, 115A Stevens - 7628
Geography	Prof. Victor Konrad, Canada House - 2222
Legal Studies*	Prof. William Pease, 150 Stevens - 2566
Linguistics	Prof. Daniel Gutman, 262 Little - 7773
Marxism-Socialism Studies	Prof. Douglas Allen, Maples - 7167
Public Relations	Prof. Richard Brucher, 211 Eng/Math - 7245
Religious Studies	Prof. Douglas Allen, Maples - 7167

*A cluster in Legal Studies is currently being developed. Specific requirements and options will be made available as soon as possible. Implementation is expected not later than September 1981.

CANADIAN STUDIES

Interdisciplinary Concentration

Prof. Ronald Tallman, Coordinator, Canada House - 2222

Rationale: Canadian Studies is an interdisciplinary area of study which enables undergraduates to combine with their major field an introduction to Canada, a nation of growing importance to the United States. The program provides a special area study for 1) students going into teaching, business, government or other professions where a knowledge of Canada is increasingly useful; 2) those specializing in some aspect of the international region; 3) students who might wish to do graduate work in a Canadian field.

The course clusters may include Canadian courses taken at a Canadian university through the Canada Year program sponsored by the Canadian-American Center. The newest aspect of the University of Maine academic program of Canadian Studies is the French Canadian Program exemplified in Cluster 4. These courses complement Canadian-American Center cultural and public service activities relating to Quebec, Acadia and Franco-America.

Course Offerings:

Cluster #1 New England and the Atlantic Provinces

*CAN 1	Introduction to Canadian Studies	Prof. Konrad
Ay 122	Folklore of Maine and the Maritime Provinces	Prof. Ives
Ay 270	Seminar in Northeastern North American Prehistory	Prof. Sanger
Ec 145	Regional Economics	Prof. Wilson
Eh 215	Literature of Maine and the Maritime Provinces	Profs. Lecker and Sprague
Geo 10	Geography of Maine	Prof. Konrad
Gy 243	Quaternary History of Northeastern North America	Prof. Borns
Hy 10	History of Maine	Prof. Schriver

Cluster #2 Canadian Culture

*CAN 1	Introduction to Canadian Studies	Prof. Konrad
Ay 172	North American Prehistory	Prof. Sanger
Eh 135	Canadian Literature	Prof. Lecker
Fr 56	Civilisation Quebecoise	Prof. Herlan
Fr 152	The Novel in Quebec	Prof. Herlan
Fr 252	Films, Video Drama and Literature in French Canada	Prof. Herlan
Geo 101	Historical Geography of North America	Prof. Konrad
Hy 159	History of Canada to 1850	Prof. Greer
Hy 160	History of Canada since 1850	Profs. Babcock and Greer

Cluster #3 Modern Canada

*CAN 1	Introduction to Canadian Studies	Prof. Konrad
Ay 160	Peoples and Cultures of the Circumpolar Region	Prof. Emerick
Geo 150	Geography of Canada	Prof. Konrad
Hy 221	Canada and the United States	Prof. Babcock
Hy 222	Canadian Economic History	Prof. Babcock

IDL 237	Evolution and Development of Canadian Government and Politics	Profs. Babcock and Horan
Jr 42	The Foreign Press	Prof. Miller
Pol 187	International Law	Prof. Collins
Sy 131	Canadian Society	Prof. Gallagher
Cluster #4 French Canada		
*CAN 1	Introduction to Canadian Studies	Prof. Konrad
Fl 97	French May Term in Quebec City	Staff
Fr 54	Quebec in Transition after 1960	Prof. Herlan
Fr 56	Civilisation Quebecoise	Prof. Herlan
Fr 9. 10	Masterpieces of French and French Canadian Literature	Profs. Rioux and Singerman
Fr 140	Franco-American Civilization	Prof. Rioux
Fr 152	The Novel of Quebec	Prof. Herlan
Fr 156	Seminar in Quebec Studies	Prof. Herlan
Fr 190	The French Language of North America	Prof. Rioux
Fr 252	Films, Video Drama and Literature in French Canada	Prof. Herlan
Fr 296	Seminar in French Canadian Literature and Language	Prof. Rioux
Hy 157	France in North America to 1763	Prof. Greer

*Required course for each Canadian Studies cluster. A minimum of three other courses (9 credit hours) is required for the completion of the cluster. Courses at the 200 level are for graduate students and selected undergraduates.

To register for the Canadian Studies clusters, students must consult with their major adviser, the Dean's Office in the College of Arts and Sciences at Stevens Hall (581-7733), and the Canadian-American Center at Canada House, 160 College Avenue (581-2222).

DEVELOPMENTAL DISABILITIES

Interdisciplinary Concentration

Assoc. Prof. Walter Harris, Coordinator		306 Shibles	Ext. 2629
Asst. Prof. Cleo Berkun	Social Welfare	221 East Annex	7380
Asst. Prof. Melda Brandt	Human Development	33 Merrill	7171
Asst. Prof. Dana Birnbaum	Psychology	380 Little	7969
Asst. Prof. Richard Cook	Human Development	21C Merrill	7171
Prof. William Dopheide	Speech Comm.	Conley Speech & Hearing Ctr.	7872
Assoc. Dean Elaine Gershman	UAP Coordinator	100 Stevens	7733
Assoc. Prof. Walter Harris	Special Education	306 Shibles	2629
Prof. Sandy Goldstone	Psychology	301B Little	7198
Prof. Mike Lewis	Art	104 Carnegie	7691
Assoc. Prof. Joseph Pechinski	Physical Education	328 Shibles	2691
Asst. Prof. Mary Ann Stankiewicz	Art	157 Carnegie	7618
Assoc. Prof. Julia Watkins	Sociology/Social Welfare	227 East Annex	7159
Inst. Lucille Zeph	Special Ed.	301 Shibles	2691

Open to selected students in the following departments and concentrations:

1. Art Education
2. Human Development
3. Physical Education
4. Psychology
5. Sociology/Social Welfare Option
6. Special Education

Course Offerings:

Prerequisites: Choose at least *one* (1) normal child behavior course — three (3) credits.

Cf 2. Introduction to Child Development—Influences on the development of the whole child at each stage of development. Theoretical perspectives and empirical evaluations. Some of the practical implications of both. Cr 3.

Py 123. Psychology of Childhood—A systematic study of the child's behavior and psychological development. Emphasis upon principles underlying development, methods of child study and practical implications. Cr 3.

Electives: Choose at least *one* (1) course in the area of normal behavior and development -three (3) credits.

Personality		
Py 103	Theories of Personality	Cr 3
Adolescence		
Py 124	Psychology of Adolescence	Cr 3
Cf 155	Adolescence	Cr 3
Sy 115	Sociology of Youth	Cr 3
Aging		
Cf 153	Adulthood and Aging	Cr 3
Py 180	Psychology of Aging	Cr 3
Sy 116	Sociology of Aging	Cr 3
Sy 115	Sociology of Youth	Cr 3
Language and Speech		
SC 180	Language and Speech Development	Cr 3
Food and Nutrition		
Fn 41	Introductory Nutrition	Cr 3
Fn 156	Maternal and Child Nutrition	Cr 3
Art		
At 65	Methods and Curricula in Art Education	Cr 3
At 69	The Teaching of Art	Cr 3
Physical Education		
Pe 53	Theories of Conditioning	Cr 2
Pe 56	Elementary School Physical Education	Cr 3
Pe 155	Philosophy and Organization of Physical Education for Elementary Schools	Cr 3
Pe 176	Kinesiology	Cr 3

Core: Choose at least *two* (2) courses - six (6) credits

EDA 100. Survey of Exceptionality—Provides students with basic knowledge about characteristics, causes and treatments of various handicapping conditions. A basic exposure to legal framework, organization of special education services and community resources provided through guest speakers and visitations. Prerequisite: field experience in special education (may be taken simultaneously). Cr 3.

EDH 115. Foundations of Exceptionality—Provides students with an opportunity to explore the historical antecedents to contemporary legal and moral issues in education of exceptional children. Course should enable students to discriminate among major theories of causation and treatment and describe current issues of importance to the field. Prerequisite: Field experience in special education, EDA 100. Cr 3.

Py 128. Psychology of the Exceptional Child—The development and behavior of the exceptional child. Special emphasis on the practical problems related to the management of children with intellectual, emotional, orthopedic, sensory, and academic handicaps. Prerequisite: Py 123 or permission. Cr 3.

Practicum: Choose 3 to 6 credit hours of work.

The experience in the University Affiliated Program (UAP) may be taken under a field experience designation or special problems depending upon the specific discipline and will include the undergraduate seminar. (See UAP in index).

Electives: Choose at least *one* (1) course - three (3) credits

Retarded		
EDM 130	Education of the Trainable Child	Cr 3
EDM 170	Methods of Teaching the Retarded Child	Cr 3
Emotionally Disturbed		
Py 112	Abnormal Psychology	Cr 3
Sy 137	The Sociology of Mental Illness	Cr 3

Communications Disorders

SC 130	Introduction to Communication Disorders	Cr 3

Physical Education for the Exceptional Child

Pe 282	Physical Education for the Exceptional Child	Cr 3

ENVIRONMENTAL ISSUES AND ECOLOGICAL STUDIES

Interdisciplinary Concentration

Faculty: Associate Professor Edward O. Schriver, Coordinator

Assoc. Prof. Ronald Davis	Botany	218 Deering	7040
Prof. John Dearborn	Zoology	321 Murray	7695
Prof. John Dimond	Entomology	312 Deering	7704
Prof. Melvin Gershman	ANV & Microbiology	302 Hitchner	7521
Assoc. Prof. Joel Gold	Psychology	356 Little	7857
Asst. Prof. Ellen Lenney	Psychology	362 Little	7418
Assoc. Prof. Stephen Norton	Geological Sciences	237 Boardman	7487
Assoc. Prof. Ray Owen	Wildlife Resources	228 Nutting	7388
Prof. Richard Ryckman	Psychology	368 Little	7198
Assoc. Prof. Edward Schriver	History	115A Stevens	7268
Asst. Prof. Malcolm Shick	Zoology	203 Murray	7960
Assoc. Prof. William Stone	Psychology	352 Little	7857
Asst. Prof. William TeBrake	History	Stevens	7630
Prof. Robert Vadas	Botany	209 Deering	7861
Prof. Edward Wade	Psychology	364 Little	7418

Rationale:

Environmental concerns are considered in many courses in many departments of the University. Some courses relate to environmental and social issues using ideas from ecology and other disciplines insofar as they relate to the issues. Others, such as ecology courses, are based on biology and include and require information from other natural sciences.

General Introductory Courses for the Non-Science Major

Choose *4* courses from Group A and at least *2* courses from Group B for a minimum of 18 credit hours.

Group A

Ps 4. Environmental Physics—A non-mathematical exploration of how physics underlies phenomena in the world around us. Several topics such as electronics, alternative energy strategies, musical instruments, nuclear reactors, sports, computers, optical instruments, Physiology, air and water pollution, etc., will be selected for analysis in terms of basic physical principles. Prerequisite: Ps 3 or permission. Cr 3. Prof. Carey. Usually offered in the spring.

MHE 50. Man and His Environment—Effect of the biological and physical environment on life and man. A basic, inderdisciplinary introduction to environmental issues such as food and populations, microbiotic diets, organic farming movements, venereal diseases, etc. Where appropriate, regular classes are complimented with guest lecturers. No prerequisites. Cr 3. Prof. Gershman.

IDL 19. Introduction to Ecology—A three-credit lecture course on ecological principles for non-science students. Cr 3. Prof. Dearborn (Zoology), Prof. Owen (Wildlife Resources).

Gy 1. Aspects of the Natural Environment—Earth materials and processes, including the structure of matter, formation of igneous rocks, radioactive age-dating, chemical and mechanical destruction of rocks, formation of sedimentary rocks, evolution of mountain belts, and formation of metamorphic rocks. No prerequisites. Cr 4. Prof. Norton.

Gy 2. Aspects of the Natural Environment—The structure and composition of the interior of the earth, mountain building processes, the origin and use of paleomagnetic data in the continental drift question; the origin and evolution of the atmosphere; the hydrosphere, and life;

mechanisms and patterns of biological evolution, man's place in and utilization of his environment. Laboratory work includes preparation for two compulsory field trips in May. Prerequisite: Gy 1. Cr 4. Prof. Norton.

Group B

Hy 117. Environmental History of Europe—Changes in the basic interrelationships between nature and human culture, emphasizing the gradual evolution of European society within its physical setting from small, isolated groups of primate agriculturalists in prehistoric times, through the complex peasant society of the Middle Ages, to the emergence of a highly urbanized, industrialized society today. No prerequisites. Cr 3. Prof. TeBrake.

Hy 177. History of the Treatment of the American Environment—This course offers the history and philosophy of the treatment of the American environment since roughly 1607. It is aimed at the intelligent student and is not soley a 'history' course as such. Prerequisites: Hy 3, 4 or two one semester courses in the Natural Sciences, or permission. Cr 3. Prof. Schriver. Course is offered spring semester.

Sy 135. Human Ecology—Spatial distribution of human beings and related activities and social processes. Prerequisite: Sy 3 or permission. Not open to freshmen. Cr 3.

Py 132. Environmental Psychology—An introduction to the study of the transactions between people and their physical environments. Representative topics include territoriality, crowding, personal space, privacy, architectural design of space, and self-control and development phenomena. Cr 3. Offered during the spring semester.

Ce 175. Contemporary Environmental Pollution—A study of causes, characteristic effects and solutions to contemporary man's pollution of the air, land, and water resources. Engineering and technological solutions. Legal, social, individual and technological obstacles to solution. Prerequisite: junior class standing. Cr 3.

Are 71. Economics of Environmental Quality—Economic aspects of environmental issues. Maintenance of quality of natural resource base, economic implications of private and public patterns of environmental use. No prerequisites. Cr 3.

Ecological Studies Courses for the Science Major:

Ecological understanding is a necessary component in the education of biologists. Increasingly, ecological awareness is important in many other fields. Choose *3* courses from Group A and *2* from Group B.

Group A

IDL 119. General Ecology—A three-credit lecture course in ecological principles. It is a required course for biology majors, and an integral part of the curricula of the Botany and Zoology Departments. It will also serve as an introductory course in ecology for incoming graduate students lacking but needing an ecological background. Prerequisites: one year of college chemistry and one year of college biological science. Cr 3. Prof. Vadas and Prof. Dearborn. Taught in the spring semester.

IDL 120. Ecology Laboratory and Field Course—A three-credit course for upperclass students who have taken IDL 119. An additional prerequisite is a prior or concurrent course in statistics. All-day field trips will take place on Saturdays, mostly during the first half of the semester when weather permits. Cr 3. Prof. Davis and Staff.

IDL 263. Benthic Marine Ecology—An advanced course emphasizing ecological studies on benthic intertidal and subtidal marine organisims. Prerequisite: A course in ecology. Cr 3. Prof. Vadas.

Zo 212. Polar Ecology—Interrealtionships between organisms and their physical and biotic environment in high latitudes. Marine ecosystems emphasized. Prerequisite: Zo 153 and Zo 156, or equivalent or permission. Cr 3. Prof. Dearborn.

Group B

Hy 117.	Environmental History of Europe.
Hy 177.	History of the Treatment of the American Environment.
Sy 135.	Human Ecology.
Py 132.	Environmental Psychology.

Ce 175. Contemporary Environmental Pollution.
Are 71. Economics of Environmental Quality.

GEOGRAPHY

Interdisciplinary Concentration

Prof. Victor Konrad, Coordinator

Prof. Marshall Ashley	Forestry	208 Nutting	7313
Assoc. Prof. Richard Blanke	History	115C Stevens	7148
Assoc. Prof. Robson Bonnichsen	Anthropology	38 S. Stevens	7634
Prof. Melvin Gershman	ANV and Microbiology	302 Hitchner	7521
Prof. Abul Huq	Economics	240 Stevens	7924
Asst. Prof. Victor Konrad	Anthropology (Geography)	Canada House	2222
Asst. Prof. Irving Kornfield	Zoology	215 Murray	7481
Prof. Louis Ploch	Agric. and Resource Ec.	203 Winslow	7476
Asst. Prof. Stephen Reiling	Agric. and Resource Ec.	207 Winslow	7193
Prof. Joseph Roggenbauer	Foreign Languages	210 Little	7897
Prof. Walter Schoenberger	Political Science	33 N. Stevens	7859
Assoc. Prof. Edward Schriver	History	115A Stevens	7268
Assoc. Prof. Thomas Taylor	Political Science	3 N. Stevens	2183
Asst. Prof. William TeBrake	History	Stevens	7630
Asst. Prof. David Tyler	Civil Engineering	336 Boardman	2561
Prof. Claude Westfall	Engineering Technology	202 E. Annex	7837
Asst. Prof. Gregory White	Agric. and Resource Ec.	307 Winslow	7707

(The above list represents faculty currently teaching courses included in the Geography Course Cluster. Changes occur from semester to semester and year to year.)

Rationale:

Geography is an established discipline at most universities in the United States. The last thirty years have seen considerable proliferation and growth of geography departments as the discipline moved from a focus on regional studies to the development of spational and locational theory. The discipline, however, remains broadly based in the earth sciences and humanities as well as the social sciences. Geographers vigorously pursue research and teaching in areas as diverse as geomorphology, hydrology, transportation, urban planning, cultural ecology, man-environment relationships and pre-history. Geography courses and degrees appeal to undergraduates seeking a general yet practical university education. Geography graduates find employment in career fields such as resource management, urban and regional planning, and environmental assessment as well as the traditional occupations of elementary and secondary school teaching.

Although the University of Maine at Orono does not offer either the B.A. or B.S. degrees in geography, a considerable number of geography and geography-related courses are taught on a regular basis. The Geography Course Cluster provides students interested in the field the opportunity to combine with their major a general or focused set of courses (minimum 18 credit hours) in human geography. Students interested only in aspects of physical geography are urged to consider courses in geology and the Environmental Issues and Ecological Studies Cluster.

Geo 1, Introduction to Human Geography or Geo 10, Geography of Maine should be taken by the interested student in the freshman or sophomore year. The interested student is also urged to discuss and plan course selection with the Coordinator Prof. Victor Konrad (Anthropology-Geography).

Course Offerings:

I. **Core Curriculum 3 to 6 credit hours**

a) *Prerequisite: Geo I. Introduction to Human Geography*—Introduction to the theory and practice of human geography. Principles of spatial analysis, land and resource use, regionalization, settlement and environmental perception explained in historical, economic, political and behavioral terms. No prerequisite. Cr 3.

OR

Geo 10. Geography of Maine—A survey of the spatial relationships and characteristics of places in Maine. After a brief study of the development of Maine's landscapes, attention is focused on land use change and conflict, regional inequalities, locational decision-making, environmental management and planning and the personality of places. No prerequisite. Cr 3.

b) Students are urged to select *one* of the following cognate courses:

Ge 16.	Cartographics
Sv 5.	Plane Surveying
Fy 6.	Photogrammetry and Remote Sensing
Geo 177.	Field Experience in Geography (May Term)

II. **Elective Courses** 12 to 15 credit hours with no more than 3 credit hours below the "100" level.

Although it is possible to take a wide range of elective courses, most students will find it useful to select courses which lead to typical, teaching and career orientations in geography. The elective courses are grouped to reflect such orientations.

a) *Urban and Regional Planning*

Careers in public administration, marketing, resource management and numerous other areas demand an understanding of human spatial and locational relationships, and an ability to predict how humans organize space. This knowledge is of particular importance in planning the growth of cities and their surrounding regions. The student interested in urban and regional planning should select from the following list of courses:

Geo 10.	Geography of Maine
Ec 144.	Urban Economics
Ec 145.	Regional Economics
Geo 150.	Geography of Canada
Pol 133.	Urban Politics
Sy 126	Sociology of Urban Life
ARE 174.	Land Use Planning
Pol 200.	City and Regional Planning
Ce 200.	City and Regional Planning

b) *Cultural-Historical*

Like historians, some geographers are concerned with the past, and like anthropologists others are involved in the study of different cultures. In both respects, a geographical perspective adds considerable breadth of knowledge on topics such as the spread of settlement, the diffusion of culture traits and the nature of past landscapes. Students, particularly those selecting majors in anthropology and history, can enrich and broaden their programs of study with courses in historical and cultural geography.

Fl 59.	Cultural Geography of Continental Europe
Ay 164.	Cultural Ecology
Ay 175.	Paleoenvironmental Archeology
Hy 177.	Environmental History of Europe
Hy 199 E.	Historical Geography of Europe
Geo 10.	Geography of Maine
Geo 101.	Historical Geography of North America
Geo 150.	Geography of Canada

Students may also include up to 6 credit hours or regional anthropology (Ay 122, Ay 141, Ay 142, Ay 151, Ay 153, Ay 154, Ay 160, Ay 171, Ay 172) and regional history (Hy 101, Hy 102, Hy 109, Hy 113, Hy 121, Hy 122, Hy 123/124, Hy 125/126, Hy 135/136, Hy 137, Hy 141, Hy 147/148, Hy 149, Hy 150, Hy 155/156).

c) *Human Use of the Earth*

The human relationship with the environment is a matter of increasing concern to society. This theme has always been a major consideration of geography. The student interested in the human use of the earth, whether as a step to a career in environmental resource management or to gain a broader understanding of the human place in the environment, is urged to select courses from the following:

IDL 19.	Introduction to Ecology
MHE 50.	Man and His Environment
S 50.	Soil and Water Conservation
Bio 60.	Interaction Between Man and His Environment
Ay 175.	Paleoenvironmental Archaeology
Hy 117.	Environmental History of Europe
Hy 177.	History of the Treatment of the American Environment
IDL 119.	General Ecology
ARE 71.	Economics of Environmental Quality
ARE 171.	Land Resource Economics
ARE 174.	Land Use Planning
P 135.	Landscape Design
Fy 157.	Watershed Management
IDL 200.	Seminar in Quaternary Studies
Fy 254.	Forest Recreation Planning
ARE 272.	Resource Use and Economic Growth

d) *Rural Resource Management*

In Maine, the wise management of rural lands with forest, agricultural and recreation resources is of considerable and increasing importance. Many new and interesting careers are and will be found in this area. For students interested in this field , a diverse knowledge of rural Maine's lands and occupants is essential. A selection of the following courses can provide such a background.

Geo 10.	Geography of Maine
IDL 24.	Sociology of Rural Life
S 50.	Soil and Water Conservation
ARE 71.	Economics of Environmental Quality
IDL 124.	Contemporary Rural Problems
IDL 129.	Individual and Community
ARE 171.	Land Resource Economics
ARE 174.	Land Use Planning
ARE 186.	Government Policies Affecting Rural America
Fy 254.	Forest Recreation Planning
ARE 272.	Resource Use and Economic Growth

e) *Locational Analysis of Economic Activities*

One of the primary concerns of geography is that of predicting and explaining the location of economic activities. Factories, stores, warehouses and other facilities, and the communication and transportation links between them, are not haphazardly placed on the landscape. There are definite reasons why these facilities are where they are, and a knowledge of these reasons is of considerable importance in such matters as industrial expansion, selecting the location for a new store, and planning a transportation system for a town. The following selection of courses treat this area of concern.

Geo 10.	Geography of Maine
Geo 150.	Geography of Canada
Ec 144.	Urban Economics
Ec 145.	Regional Economics
ARE 71.	Economics of Environmental Quality
ARE 171.	Land Resource Economics
ARE 174.	Land Use Planning

f) *Geopolitics*

The partitioning of land, zoning, the distribution of electoral districts, and the division of the earth's surface into national, regional and municipal territories all have political significance. The student of politics has much to gain from a clearer understanding of political geography. The following courses are useful in this regard.

Geo 10.	Geography of Maine
Geo 123/ 124.	Political Geography
Geo 150.	Geography of Canada
Pol 133.	Urban Politics

ARE 174. Land Use Planning
ARE 186. Government Policies Affecting Rural America
Pol 200. City and Regional Planning

g) *Spatial Organization of Society*

Human occupance of the land and the distribution of human groups are highly organized. For example, specific social class groups in the city reside in particular neighborhoods and maintain barriers and distance between themselves and other groups. The spatial organization of society is treated in the following courses:

Geo 10. Geography of Maine
Geo 150. Geography of Canada
IDL 24. Sociology of Rural Life
Sy 126. Sociology of Urban Life
Sy 135. Human Ecology
Sy 142. Population and Society
IDL 124. Contemporary Rural Problems
IDL 129. Individual and Community

LINGUISTICS

Interdisciplinary Concentration

Assoc. Prof. Daniel Gutman, Coordinator

Assoc. Prof. Paul Bauschatz	English	215 Eng/Math	2233
Prof. Jacob Bennett	English	313 Eng/Math	7965
Assoc. Prof. Daniel Gutman	Foreign Lang.	262 Little	7773
Asst. Prof. Margaret Hardin	Anthropology	36B S. Stevens	7166
Asst. Prof. Rex Pyles	Foreign Lang.	270 Little	7771
Assoc. Prof. Conrad LaRiviere	Speech Comm.	N. Stevens	7872
Prof. Jefferson White	Philosophy	Maples	7167

Rationale:

Thanks to the institution of Course Clusters, students at this University can now avail themselves of a program leading to a minor concentration in Linguistics.

Linguistics is the field of study concerned with language, both as a general human faculty and as manifested in particular languages. This discipline includes topics such as: the acquisition of language; its sounds; its meaning; its structure; its social and cultural aspects; its families and dialects; its change. Since language is so characterisitc of man and so pervasive in all he does, it proves relevant or applicable to many other fields, ranging from education to international affairs to literature.

Course Offerings:

The Linguistics program entails a minimum of fifteen credits distributed as follows:

I. **Core**

At least three courses must be completed in this category, one from each subcategory.

A. *Introduction*
IDL 110. Introduction to Linguistics

B. *Language Structure*
Fl 153. Phonology
Eh 121. Syntax

C. *Language in Context*
Ay 180. Socio-Linguistics
Ay 181. Language and Culture
SC 180. Language and Speech Development

II. **Electives**

To reach or go beyond the fifteen credit minimum, students may choose courses in this category. The enumeration here is not definitive; new courses, projects, special

seminars, or pertinent readings in upper honors courses may be approved for the program.

Eh 111.	History of the English Language
Fr 120.	French Phonetics
Fr 200.	History of the French Language
Fr 210.	French Linguistics
Ms 141.	Mathematical Logic
Pl 50.	Philosophy of Language
Pl 131.132	Logic (I and II)
Cs 181.182	Introduction to Computer Science (I and II)
Cs 186.	Programming Languages
SC 184.	Basic Research in Speech and Hearing Science

Note that the three areas—Humanities, Social Sciences, Natural Sciences—are represented among the courses listed for this program. Students may therefore satisfy area requirements by selecting courses from this list.

Although one may fulfill the minimum requirements by taking five courses from Category I and none from Category II, it is expected that students will choose one or more of the elective courses.

Marxism-Socialism Studies

Interdisciplinary Concentration

Assoc. Prof. Douglas Allen, Coordinator

Assoc. Prof. Douglas Allen	Philosophy	Maples	7167
Asst. Prof. Steven Barkan	Sociology	216 E. Annex	7487
Assoc. Prof. Richard Blanke	History	115C Stevens	7148
Prof. Stewart Doty	History	145 Stevens	7305
Assoc. Prof. James F. Horan	Political Sci.	23 N. Stevens	7795
Prof. Abul Huq	Economics	240 Stevens	7924
Assoc. Prof. Mark A. Lutz	Economics	250 Stevens	7834
Assoc. Prof. Stephen Marks	Sociology	213 E. Annex	7945
Prof. John Nolde	History	130 Stevens	2524
Asst. Prof. Joseph Rouse	Philosophy	Maples	7168
Assoc. Prof. Howard Schonberger	History	Stevens	7630
Assoc. Prof. Charles Scontras	Modern Society	E. Annex	7917

Rationale:

The major motivation for organizing the Marxism-Socialism Studies Course Cluster has been the desire to encourage students to look at the world from a Marxist/Socialist perspective. Many departments offer approaches which have their foundation in the work of such economic theorists as Adam Smith and such political philosophers as Thomas Hobbes and John Locke. Such approaches seem to assume that capitalist values are "natural," according to human nature," progressive, just, or simply the only way that rational people would view the world. Marxism challenges such assumptions and judgments and such a world outlook.

As an approach to history and society, Marxism places primacy on the mode of production and the division of labor and sees class struggle as the primary force of historical development. Such an alternative Marxist/Socialist perspective allows students to take seriously such concepts as imperialism, analyzed as an outgrowth of captialism on a global scale. Such an alternative perspective will examine various analyses of the state and will allow students to approach the state not as some "neutral" entity but as the result of class conflict and as basically reflecting the class interests of those who hold power in any society.

Finally, Marxism is an invitation to examine basic concepts of rationality and objectivity in a different light. Marxism rejects the claim by other approaches to be "value-free" and "neutral." The Marxist/Socialist alternative will maintain the unity of theory and practice and the position that all approaches, either explicitly or implicitly, reflect value assumptions and judgments and a specific world outlook.

Course Offerings:

The organizers of the Marxism/Socialism Studies Course Cluster recognize that there are many courses offered at the University which allow a student to gain insight into various

dimensions of Marxism, socialism, and anti-imperialism which are not presented from a Marxist or socialist perspective.

Only professors offering the "core courses" agree with the Rationale of the cluster and teach their courses accordingly. Professors of the "elective courses" either do not accept the Rationale (in part or in whole) or offer courses which do not primarily deal with Marxism, socialism, or anti-imperialism.

All students who elect the Marxism-Socialism Course Cluster should take Pl 124, Introduction to Marxist Philosophy: From Marx to Mao, three other courses from the "core courses", and two courses from the "elective courses". In addition these courses should be taken from at least three different disciplines.

Core Courses:

Economics		
Ec 10.	Principles of Economics	M. Burke
Ec 136.	Marxism Economics	M. Burke
Ec 138.	Economic Development	M. Burke
Ec 270.	Alternative Economic Theory & Policy	M. Burke & M. Lutz
History		
Hy 167.168	20th Century U.S. History	H. Schonberger
Hy 173.174	U.S. Diplomatic History	H. Schonberger
Hy 199.	History of Radicalism in the U.S.	H. Schonberger
Philosophy		
Pl 6.	Social Issues in Recent Religious and Philosophical Thought	D. Allen
Pl 104.	Nineteenth Century Philosophy	J. Rouse
Pl 124.	Intro. to Marxist Philosophy: From Marx to Mao	D. Allen
Sociology		
Sy 160.	Major Ideas in Sociology	S. Marks

Elective Courses:

Economics		
Ec 135.	History of Economic Thought	A. Huq
Ec 137.	Comparative Economic Systems	M. Lutz
History		
Hy 109.	Twentieth Century Europe, 1919 to Present	R. Blanke
Hy 124.	History of Modern Russia	R. Blanke
Hy 141.	History of Modern China	J. Nolde
Modern Society		
My 2.	Modern Society	C. Scontras
Philosophy		
Pl 153.	Philosophy of History	J. Rouse
Political Science		
Pol. 136.	The Communist Government of the Soviet Union	J. Horan
Sociology		
Sy 3.	Introduction to Sociology	S. Barkan
Sy 113.	Deviant Behavior	S. Barkan
Sy 130.	American Culture and Social Structure	S. Marks

PUBLIC RELATIONS

Interdisciplinary Concentration

Assoc. Prof. Richard Brucher, Coordinator

Assoc. Prof. Paul Bauschatz	English	215 Eng/Math	2233
Assoc. Prof. Richard Brucher	English	211 Eng/Math	7245
Assoc. Prof. Warren Burns	Speech Comm.	340 Stevens	2131
Assoc. Prof. Arthur Guesman	Journalism	1 Lord	2289
Inst. Dean Lewis	Business	S. Stevens	

Rationale:

Through the Interdisciplinary Course Clusters program of the College of Arts and Sciences, UMO students can now build a concentration in Public Relations.

As public and private organizations have grown larger and more complex, the need to communicate with clients, constituents, and the general public has become more urgent and difficult. All organizations try to present themselves favorably to others, and most need to solicit acceptance of their ideas, services, and products. Some public relations concepts call simply for the presentation of a favorable image of the organization. Others attempt actively to shape public opinion in order to further the programs, ideals, and other interests of the organization. Individuals, staffs, and even entire departments now specialize in public relations, and a body of knowledge and skills have grown around the total concept.

The Public Relations Course Cluster has been designed to provide students with a basic program for entering the broad field of public relations. Courses included in the program outlined below should help the students develop and apply communication skills. The cluster requires a minimum of 15 credits, distributed as follows:

Course Offerings

I. Core.

At least three courses must be completed in this category, one from each subcategory. (Course prerequisites are given in the parentheses.)

A. *Speech Communication in Public Relations*

SC 57.	Business and Professional Speaking (SC 2 or 3)
SC 87.	Public Relations: Oral Communication Strategies (SC 57)
SC 101.	Persuasive Speaking (SC 2 or 3)

B. *Journalism in Public Relations*

JR 31.	Reporting and Newswriting I (no. Fr.)
JR 55.	Introduction to Advertising

C. *English in Public Relations*

EH 3.	Introduction to Language and Literature
EH 7.	Intermediate Composition (Eh 1, So. standing)
EH 17.	Advanced Professional Exposition (Eh 1, Jr. or Sr. standing)

II. Electives.

To go beyond the 15-credit minimum, students may choose courses from this category. The list is not definitive; new courses, seminars, field experiences, and other projects may be approved for the program.

BA 123.	Principles of Management and Organization (Ec 10, Jr. standing)
BA 161.	Personnel Management and Industrial Relations (Ec 10, Py 1, Jr. standing)
BA 164.	Dynamics of Organization and Behavior (Ba 123)
BA 165.	Advertising (Ba 163) (May not be combined with Jr 55).
EC 10.	Principles of Economics
EH 95.	English Apprenticeship (Field Experience) (24 credits in Eh, including Eh 7 or 17; and permission)
JR 155.	Advertising Copywriting and Layout (Jr 55)
JR 193.	Problems in Journalism (Jr 32 or 33, Sr. standing)
POL 151.	Public Administration (Pol 1)
POL 158.	Public Opinion (Pol 1, Jr. standing)
SC 77.	Interviewing (SC 2 or SC 3)
SC 150.	Field Experience in Speech Communication (15 credits in SC; and permission)
SC 192.	Organizational Communication (SC 57)

Although students may fulfill the minimum requirements by taking five courses from Category I and none from Category II, they are expected to choose one or more of the electives and to select courses from outside their majors.

RELIGIOUS STUDIES

Interdisciplinary Concentration

Assoc. Prof. Douglas Allen, Coordinator

Assoc. Prof. Douglas M. Allen	Philosophy	Maples	7167
Asst. Prof. Jay Bregman	History	Stevens	7889
Prof. Richard G. Emerick	Anthropology	46B S. Stevens	7102
Assoc. Prof. Richard K. Fenn	Sociology	East Annex	7649
Assoc. Prof. Burton N. Hatlen	English	317 Eng/Math	7129
Prof. Ralph O. Hjelm	Philosophy	Maples	7167
Prof. John J. Nolde	History	130 Stevens	2524
Prof. John R. Wilson	English	205 Eng/Math	7379

Rationale:

Traditionally, questions about the ultimate meaning of human existence have been posed in the form of religious questions. The courses included in the religious studies cluster are designed to help students understand what these questions are, what kind of answers people have found to these questions, and how societies have given institutional form to the world-views which emerge from these answers. A student who elects this cluster should develop an awareness of the broad range of religious phenomena as well as the various analyses of such phenomena. All students who elect this cluster should begin by taking *Pl 5, Introduction to Religious Studies*. Thereafter the student should take at least *three* courses from one of the following sub-clusters: i.e. *three* courses from A, or *three* courses from B, or *three* courses from C, or *three* courses from D.

Course Offerings:

A. Religion in the Development of Western Civilization

Pl 102.	Medieval Philosophy
Pl 160.	Introduction to Biblical Thought
Pl 161.	The New Testament and Early Christianity
Pl 162.	Religious Thought from the Reformation to the Enlightenment
Pl 168.	Nature in Philosophy and Religion
Flt 180.	Dante—The Divine Comedy
Hy 103.104	The Middle Ages
Hy 105.	The Renaissance and Reformation
Hy 199.	Conflict of Religions in the Roman Empire (Contemporary Problems in History)
Eh 43.	American Literature
Eh 164.	Milton
Eh 187.188	The Victorians

B. *Theoretical Perspectives on Religion*

Pl 156.	Philosophy of Religion
Pl 157.	The Nature of Religious Experience
Pl 169.	Topics in Religious Studies
Sy 182.	The Sociology of Religion
Ay 190.	The Traditional Theory of Literature (Topics in Literature)

C. *Religion in the Non-Western World*

Pl 164.	Religions and Philosophies of the East—Hinduism
Pl 165.	Religions and Philosophies of the East—Buddhism
Hy 135.136	History of China
Hy 137.	History of Modern Japan
Ay 141.	People and Cultures of the Pacific Islands
Ay 151.	North American Indian Ethnology
Ay 153.	Peoples and Cultures of Mesoamerica
Ay 160.	Peoples and Culture of the Circumpolar Area

D. *Religion in the Contemporary World*

Pl 6.	Social Issues in Recent Religious and Philosophical Thought
Pl 163.	Recent Religious Thought
Pl 167.	Religion in America

Sy 111. Religion and American Society
Eh 190. Tolkien and Modern Fantasy (Topics in Literature)

SPECIAL PROGRAMS

Projects-In-Learning—Projects-in-Learning consists of several component programs which are experimental in nature, and designed to offer to qualified students an opportunity to explore in depth subjects not normally dealt with in the curriculum.

One program, Independent Study, (I.S. 100), is available to students with an accumulative point average of 2.5 or better and second semester freshman standing or above. Independent study projects are arranged between instructor and student. An instructor helps the student shape a project and is available for guidance at all times; however, emphasis is on the word *independent* and the student is encouraged to work on his own. Independent study projects can be used to satisfy requirements with the prior approval of the department head.

The second component is the Special Seminar (S.S.) Program. Each semester seminars dealing with topics not covered in depth in regular courses are offered to students who have an accumulative point average of 2.0 or better and have second semester freshman standing or above. Emphasis is placed on topics of concern to interested students and faculty and range from those dealing with contemporary social problems to those designed to explore the unusual and provacative. Examples of seminars recently offered are: "The Brain and the Computer" and "Contemporary Poetry." Special seminars carry degree credit but do not satisfy any university, college, or departmental requirements.

The Projects-in-Learning Program is directed by a supervisory committee which must approve all projects work. Student, faculty, and administrators are encouraged to formulate and submit imaginative proposals to the committee which consists of four faculty members and four students.

Eligible students may take the freshman seminar and up to four "projects" in their last three and one half years but no more than one each semester. *All projects work is graded Pass or Fail.*

Information may be obtained from any Projects-in-Learning Committee member or from the Student Information Center, Office of the Dean, 110 Stevens Hall.

The Bachelor of Arts in Special Studies—A limited number of students in the College of Arts and Sciences are permitted to construct for themselves special "majors" other than those presently existing.

Such students might: (1) be from such groups as the Onward Program; (2) have special backgrounds such as the military, business, the ministry, etc.; (3) be especially gifted in such things as mathematics, computer science, physics, or languages, political experience, law, etc., and for whom the traditional major unduly restricts their unusual and unique abilities.

The program is centered in the Office of the Dean of the College, and is administered by a Special Studies Committee appointed by the Dean.

The program is limited to approximately 50 students, who will declare a BASS major at the usual time in their sophomore year; all college generalization requirements must be met; 120 hours will be required for graduation, 72 of which must be elected outside of any one department; the college 2.0 accumulative average will apply to this program as well as other existing rules.

Students in this program must have been in the program for his last 28 hours, and at least 60 hours must be taken in upperclass level courses.

Double Majors Across Colleges—In order to obtain a double degree/major across colleges, a student *must* satisfy the requirements for *both* colleges and majors.

The double major must be in two distinct and separate majors. For example, a student may not be granted a B.S. in Biology and Zoology.

Double majors across college lines are possible in many fields. Students intending to become candidates for such double majors must declare their intent to the deans of both colleges no later than the beginning of their junior year.

The Living/Learning Program—The Living/Learning Program is an attempt to integrate the academic and the residential dimensions of student life. The program is centered in Stewart Complex, a residence hall complex which includes Gannett, Androscoggin, and Cumberland

Halls. Students from all of these halls are invited to take courses in the Living/Learning Program. These courses meet in Stewart Commons, and they include divisions of standard introductory courses (Eh 1 and Eh 6; Pol 1 and Pol 3, for example), some advanced courses, and a few special seminars designed for the Living/Learning Program. All courses carry full academic credit, and they can be used to satisfy college and university requirements. They differ from other courses *only* in that most students in the courses are residents of Stewart Complex. By bringing students from the residential complex together in these courses, the Living/Learning Program seeks to create a sense of intellectual community that extends beyond the classroom. When students who are learning together are also living together, it becomes possible to bring teachers into the residence halls for evening office hours, academic advising, and informal discussions; and the Living/Learning Program is also encouraging faculty members to involve themselves in residence hall activities in these and other ways.

For further information on this program, prospective students and their parents may write to Prof. Burton Hatlen, 317 English/Math Building, UMO.

COURSES OF INSTRUCTION

Courses numbered 1 to 99 are undergraduate courses. They are open to graduate students, but credit earned in these courses may not be used to satisfy advanced degree requirements. Courses numbered 100 to 199 are upperclass undergraduate courses which may be used for graduate degree credit by graduate students if given prior approval by the graduate students' advisory committee. Courses numbered 200 to 299 are graduate courses which may be elected by undergraduate honor students, or those undergraduates whose advancement in the field will permit their taking a graduate level course among graduate students without disadvantage to themselves. Courses numbered 300 to 399 are graduate level courses which may be taken only by students admitted to the Graduate School.

One number is used for a course which is given in both fall and spring.

When a dash is used between the two numbers (e.g., 1-2), both semesters must be taken to obtain credit; when a slant is used (e.g., 1/2), the first semester may be taken by itself, but the second cannot be taken unless the first is taken previously; when a period is used (e.g., 1.2), either semester may be taken for credit.

ANTHROPOLOGY (Ay)

Professors Emerick, Ives, Sanger (Chairman); Associate Professors Acheson, Bonnichsen, Faulkner; Assistant Professors Hardin, Hoover, Konrad, Lazarowitz, Sorg.

Faculty in the Department of Anthropology present an undergraduate program of study designed to expand the student's awareness of human culture and history. Primary subdisciplines represented in the academic program include cultural and social anthropology, historic and prehistoric archaeology, biological anthropology, folklore, and anthropological linguisitics. The program is designed to acquaint the student with fundamental concepts, principles and research skills in these sub-disciplines. Students are expected to sample courses from the various sub-disciplines to develop a broadly based understanding of anthropology. When a student declares a major, a faculty adviser specializing in a sub-discipline close to the student's interests is assigned. In consultation with his adviser, the undergraduate major will formulate a program of study that meets college and departmental requirements, provides him with an opportunity to develop his interests and develops a background suitable for pursuing occupational goals. The student and the faculty adviser will meet at least once each year to discuss the student's program. This policy is designed to provide the student with encouragement, counseling and direction.

Specific Requirements for Majors

In order to insure that the student receives broad training in Anthropology and exposure to certain core concepts, the following courses are required.

a. Ay 1.2 Introduction to Anthropology

b. Ay 115 Basic Theory and Principles in Social and Cultural Anthropology

c. IDL 110 Introduction to the Study of Linguistics

d. Ay 21 Introduction to Folklore

e. Ay 170 Introduction to Archaeology

f. Statistics. The student, with the approval of his adviser, may select one of the following to meet the Statistics requirement: Ms 18, Py 141, Fy 4, ARE 12, S 271 (S271 is recommended only for advanced students)

g. Intermediate level proficiency (which may be demonstrated either by course work or examination) in a foreign language is strongly recommended. Students planning a career in applied anthropology should consider language skills an essential part of their training. Most graduate programs in anthropolgy require 1 if not 2 foreign languages.

Note:

Ay 1.2 should be taken in the freshman or sophomore year. Ay 115 and Ay 170 should be taken in the sophomore year, or in the junior year at the latest. Senior Ay majors will not be permitted to take Ay 115. Other required courses should be taken as early in the major program as possible, since these are prerequisites to upper level courses. Courses in statistics and foreign language may be counted towards satisfying Arts & Sciences college requirements.

The faculty may be willing to discuss alternative prerequisites, particularly for upperclassmen who decide upon an anthropology major relatively late in their undergraduate careers. Certain requirements may be waived, such requests should be initiated through the student's adviser.

Course Distribution

A minimum of 18 hours of additional courses are required for the major. Students are encouraged to include a broad sampling of the sub-disciplines of anthropology in their upper division course program. They are expected to include courses from each of the following three categories:

AREA. The subject matter of these courses, which may deal with historical or contemporary cultures, is defined in terms of a geographical area or a broadly defined pattern of cultural adaptation.

Ay 144	Maritime Ethnology
Ay 150	Hunters and Food Gatherers
Ay 167	Peasant Societies
Ay 168	Complex Societies
Ay 141	Peoples and Cultures of the Pacific Islands
Ay 142	Mediterranean Ethnology
Ay 151	North American Indian Ethnology
Ay 155	People and Cultures of Subsaharan Africa
Ay 154	Cultures and Societies of the Middle East
Ay 160	Peoples and Cultures of the Circumpolar Area
Ay 122	Folklore of Maine and the Maritime Provinces
Ay 171	Old World Prehistory
Ay 172	North American Prehistory
Geo 101	Historical Geography of North America
Geo 150	Geography of Canada
Ay 270	Seminar in Northeastern North American Prehistory
Ay 153	Peoples and Cultures of Mesoamerica

ASPECTS. These courses focus on specific social institutions or cultural domains.

Ay 123	Folksong
Ay 124	Narrative
Ay 163	Systems of Kinship and Descent
Ay 165	Political Anthropology
Ay 166	Economic Anthropology
Ay 169	Anthropological Approaches to Religion
Ay 133	Anthropology of Art
Ay 105	Nutritional Anthropology
Ay 137	Medical Anthropology
IDL 114	Women in Society

PRACTICE AND THEORY. Courses which focus on data gathering, processing and analysis or on the models and assumptions underlying anthropologists' approaches to the analysis of their data.

Ay 125	Oral History and Folklore: Fieldwork
Ay 139	Psychological Anthropology
Ay 164	Cultural Ecology
IDL 158	Culture and Economic Development
Ay 173	Historic Archaeology
Ay 175	Paleoenvironmental Archaeology
Ay 177	Field Research in Archaeology
Ay 178	Faunal Analytic Techniques in Archaeology
Ay 179	Advanced Laboratory Techniques in Archaeology
Ay 180	Sociolinguistics
Ay 181	Language and Culture
Ay 190	Topics in Anthropology
Ay 199	Advanced Theory in Social and Cultural Anthropology
IDL 200	Seminar in Quaternary Studies
Ay 276	Models in Archaeology
Ay 174	Conservation and Analysis of Historic Artifacts
Ay 273	Advanced Methods in Historic Archaeology
Ay 102	Human Evolution
Ay 101	Physical Anthropology

Special Resources

Teaching and research strengths of the faculty are concentrated in the topical areas of archaeology, ecology, economics, folklore, material culture and technology. A number of ongoing research programs in the New England and Maritime Provinces reflect these topical interests. Students who wish to receive training in field, laboratory and archival research in folklore and historical and prehistoric archaeology may have an opportunity to participate in research projects. Additional specialized training in disciplines closely allied to prehistoric archaeology may be pursued through the graduate program of the Institute For Quaternary Studies. Students may gain further training in Linguistics and Geography by following their respective core clusters. Special resources of the Department include the Museum of Anthropology, the Northeast Archives of Folklore and Oral History and historic and prehistoric archaeology laboratories. These facilities are used to integrate teaching and research activities.

A minimum of 36 hours carrying major credit must be taken. The College has established a 48-hour maximum for all departments.

Courses in Anthropology (Ay)

1.2 Introduction to Anthropology—The development of man as a biocultural phenomenon. Special emphasis on human paleontology and race formation, the nature of culture and such human institutions as social organizations, marriage, religion, economics, etc., among preindustrial tribal people, with some application of derived principles to contemporary industrial societies. Required of majors. Cr 3.

21. Introduction to Folklore—A survey of the different genres of folklore, its forms, uses, functions and modes of transmission. Emphasis on belief, custom and legend. Cr 3.

101. Physical Anthropology—A lecture course which introduces current topics in human biology and evolution, including: human origins and the fossil record, human genetics and population variability, and human and non-human primate behavior. Prerequisites: Ay 1 or permission of instructor.

102. Human Evolution—A lecture course presenting the fossil evidence for human origins and evolution. Changes in morphology and behavior from our primate ancestry to the emergence of anatomically modern *Homo sapiens* are considered in the light of modern evolutionary theory and current ethnographic and ethological models. Prerequisite: Ay 101 or permission of instructor. Cr 3.

105. Nutritional Anthropology—Lecture course presenting the anthropological approach to the study of food preferences and eating patterns, as well as individual and population

variability in nutrient requirements for different environments and life stages. Emphasizes both biological and sociocultural aspects of such topics as obesity, lactose intolerance infant feeding practices, and food networks. Prerequisite: Ay 1 or 2 or FN 41 or permission of instructor. Cr 3.

IDL 105. Women of Maine: An Autobiographical Approach—An interdisciplinary course taught by cooperating faculty from anthropology, history and speech. Through the use of taped interviews of selected Maine women and men, students will explore the traditional language of and about women. Prerequisite: sophomore and above. Cr 3.

IDL 110. Introduction to the Study of Linguistics—Comprehensive survey of language structure and function with attention to its socio-cultural, psychological, and historical aspects. Provides students with basic conceptual and technical tools for understanding the phenomenon of language. No previous training in languages or linguistics required. Course same as Eh, Fl 110. Cr 3.

**IDL 114. Women in Society*—An interdisciplinary analysis of women's roles from an anthropological-sociological, psychological and historical perspective. Analysis of sex role formation and maintenance in Western industrial and more traditional societies. Changes in women's roles in the 19th and 20th centuries. Prerequisite: junior standing or permission. Py 1 recommended. Cr 3.

115. Basic Theory and Principles in Cultural and Social Anthropology—Basic ideas and analytical concepts in cultural and social anthropology. Integration of these key ideas and understanding their historical antecedents. Practice in applying these principles to specific data through exercises and the reading of key monographs. Three lectures, one recitation each week. Prerequisites: Ay 1.2 or permission. Cr 4.

122. Folklore of Maine and The Maritime Provinces—A survey of some of the genres of folklore as found in the major linguistic traditions (English, French, Indian) of the Northeast, with emphasis on Maine as the nexus of New England and Maritimes cultures. Special attention given to the occupational traditions of farming, fishing and lumbering. Prerequisite: Ay 21 or permission of instructor. Cr 3.

123. Folksong—The place of music in human culture, its forms, functions, uses, methods of composition, manner of performance, esthetic theories, etc. Illustrative material chiefly drawn from Euro- and Afro-American folksongs (ballads, blues, worksongs, etc.). Emphasis on listening to and analysis of field recordings. No musical background or training required. Prerequisite: Ay 21 or permission. Cr 3.

124. Narrative—Narrative and storytelling as universals in human culture. Definitions and distinctions (myths, legends, history, story, truth, fiction); uses and functions; performance and creativity. Illustrative material drawn from a variety of cultures, including North American Indian groups. Prerequisite: Ay 21 or permission. Cr 3.

125. Oral History and Folklore: Fieldwork—Training and experience in collecting materials of folklore, folklife and oral history, especially through use of tape recorders. Advance preparations, interviewing techniques, processing of transcripts, and utilization of materials so gathered in writing and research. Tape and equipment provided. Prerequisite: permission of instructor. Cr 4.

133. Anthropology of Art—A general survey of anthropological approaches to the aesthetic and stylistic aspects of material culture. The study of systems of art and design in their social cultural contexts, including the cognitive basis of style, representation and meaning, and the structure of variation and style change. Emphasis on theoretical issues raised by the comparative study of the arts and crafts of tradition and acculturation. Prerequisite: Ay 1.2 or permission of instructor. Cr 3.

137. Medical Anthropology—Lecture course on health systems in western and non-western societies; focus on health beliefs and their relationship to evolution, ecology, and epidemiology. Prerequisite: Ay 1 or permission of the instructor. Cr 3.

139. Psychological Anthropology—An introduction to the concepts, theories and techniques involved in anthropological investigations of the relationships of culture, society, and the individual. Prerequisite: Ay 1.2 or permission of instructor. Cr 3.

*Not offered in 1980-81.

141. People and Cultures of the Pacific Islands—Problem of migration to and peopling the Pacific world. Development of distinct cultural traditions traced in Australia. Melanesia, Micronesia, and Polynesia. Possibility of transpacific contact with pre-Columbian America. Special problems of these Oceanic people in the modern world. Prerequisite: Ay 1.2 or permission of instructor. Cr 3.

**142. Mediterranean Ethnology*—Designed to consider various anthropological approaches to the Mediterranean culture area. Emphasis on persistence and change in social institutions characteristic of the rural or "traditional" segments of regional groupings around the Mediterranean. Prerequisite: Ay 1.2 or permission of instructor. Cr 3.

**144. Maritime Ethnology*—A general anthropological survey of Man's adaptation to maritime areas. Emphasis on theoretical issues raised by the comparative study of primitive, peasant and modern cultures that rely on the resources of the sea. Prerequisite: Ay 1.2 or permission of instructor. Cr 3.

150. Hunters and Food Gatherers—A survey of the vanishing people whose subsistence economy has remained at the hunting and gathering level. Focus on groups in all major geographical and cultural areas. Unique and common problems. Emphasis on ethnohistorical, environmental, and acculturation factors. Prerequisite: Ay 1.2, or permission of instructor. Cr 3.

**151. North American Indian Ethnology*—A survey and analysis of native American peoples north of Mexico, covering both traditional culture patterns and modern developments and problems. Includes consideration of traditional culture areas, emphasizing adaptations and cultural dynamics, past and present. Prerequisite: Ay 1.2 or permission of instructor. Cr 3.

**153. People and Cultures of Mesoamerica*—Contemporary peasant societies of Mexico and Guatemala. Short history of these communities since the Spanish Conquest. Comparison of Mestizo and Indian communities; relations between folk societies and urban areas. Current theory concerning Middle American societies. Prerequisite: Ay 1.2 or permission of the instructor. Cr 3.

154. Cultures and Societies of the Middle East—Cultures and societies of the Middle East. Emphasis on Arab world, Turkey, Iran and Afghanistan. Religious organization, kinship, political organization, and economics. Contemporary life and the current problems in the ethnography. Ay 1.2 or permission of instructor. Cr 3.

155. People and Cultures of Sub-Saharan Africa—Selected societies and culture areas of Africa. An intensive study of societies in differing areas which exhibit important structural principles. Prerequisite: Ay 1.2 or permission. Cr 3.

**IDL 158. Culture and Economic Development*—The interface between cultural anthropology and economics, especially as these disciplines shed light on problems of economic change in the societies of the Third World. Prerequisite: Ec 10 and Ay 2, or permission. Cr 3.

160. Peoples and Cultures of the Circumpolar Area—The development of northern cultures in both the Old and the New Worlds traced from prehistoric times to the present. Problems of economics, social structure, and cultural organization. Prerequisite: Ay 1.2, or permission of instructor. Cr 3.

163. Systems of Kinship and Descent—A study of the basic concepts of kinship and descent in primitive and tribal societies; examination of specific systems; critical examination of the different approaches to the study of them. Emphasis on the relationship between kinship and other aspects of social structure. Prerequisite: Ay 115 or permission of instructor. Cr 3.

164. Cultural Ecology—Comparative study of human populations in ecosystems. The adaptive nature of culture. Implications of the ecological approach for anthropological theory, sociocultural evolution and change, and contemporary problems. Case studies from simple and complex societies. Prerequisite: Ay 115 or permission of instructor. Cr 3.

165. Political Anthropology—Mechanisms and institutions for mediating disputes and allocating public power in selected non-Western societies. Prerequisite: Ay 1.2, or permission of the instructor. Cr 3.

166. Economic Anthropology—Comparative study of production, consumption and exchange in selected non-Western societies. Emphasis on factors influencing economic decisions

*Not offered 1980-81.

in a variety of social and cultural settings. Prerequisite: Ay 115 or permission of instructor. Cr 3.

167. Peasant Studies—Peasants, neither primitive nor modern, are the majority of humanity. Study of the similarities and differences among and between peasant societies in various parts of the world. A critical examination of the body of anthropological theory concerning peasantry. Prerequisite: Ay 1.2 or permission of the instructor. Cr 3.

168. Social Anthropology of Complex Societies—An examination of selected problems and theoretical approaches in the study of complex societies and civilizations. Emphasis on contemporary non-industrialized societies. Prerequisite: Ay 1.2 or permission of instructor. Cr 3.

169. Anthropological Approaches to Religion—Designed to consider various anthropological approaches to religion. These will include evolutionary, historical,psychological, functional and structural approaches. Emphasis on the appropriateness of these theories for the wide range of cross-cultural material available. Prerequisite: Ay 1.2, or permission of instructor. Cr 3.

170. Introduction to Archaeology—Methods of archaeological research. Techniques of excavation and analysis; theoretical basis of methods and fundamental principles; application to specific case studies; interpretation of findings; the use of geological, biological, chemical and other tools in archaeological research. A one-day compulsory field trip on a weekend to visit local archaeological sites. Prerequisites: Ay 1.2 or permission of the instructor. Cr 3.

171. Old World Prehistory—The prehistory of man in the eastern hemisphere from the beginnings of culture through the development of agriculture and urbanism. The development and elaboration of human society as inferred from material remains. Prerequisite: Ay 170, or permission of the instructor. Cr 3.

172. North American Prehistory—The prehistory of man in North America from his arrival to European contact. A survey of major developments such as the spread of agriculture. Emphasis on late and post-glacial adaptations to environment. Prerequisite: Ay 170, or permission of the instructor. Cr 3.

173. Historic Archaeology—A review of techniques and methods employed in historic archaeology covering excavations and methods of analyses. Emphasis is on North American archaeology. Prerequisite: Ay 1.2 or permission of instructor. Cr 3.

174. Conservation and Analysis of Historic Artifacts—A laboratory course covering techniques for stabilizing and interpreting artifacts from historic sites. Both hand crafted and mass-produced items will be considered, especially glass, ceramic, and iron wares of the 17th, 18th, and 19th centuries. Specimens will generally be derived from UMO summer excavations in Maine. Prerequisite: Ay 173 or Ay 177 or consent of instructor. Cr 3.

175. Paleoenvironmental Archaeology—An introduction is provided to historical and current theoretical literature which is used to explain cultural environmental relationships in prehistoric contexts. Emphasis on outlining the kinds of environmental data that survive in the historical record, e.g. geological, floral, faunal, soils, etc.; the sampling methods used to collect different kinds of data and types of inferences that can be made from surviving data regarding fossil cultural environmental relationships. Prerequisite: Ay 170. Cr 3.

177. Field Research in Archaeology—Introduction to archaeological field techniques by excavation of prehistoric sites in Maine. Intensive training in site survey excavations techniques, recording, analysis and preliminary interpretation of archaeological materials. Prerequisites: Ay 1 and 2 (or equivalent) and permission of instructor. Cr 6. (Summer only).

178. Faunal Analytic Techniques in Archaeology—A laboratory course covering techniques for analyses and interpretation of osteological remains from archaeological sites. Prerequisite: Ay 170 or permission of instructor. Rec 2, Lab 2, Cr 3.

179. Advanced Laboratory Techniques in Archaeology—A review of site sampling, and artifact classification necessary to the preparation of archaeological site reports. Prerequisites: Ay 170; some field experience recommended. Rec 2, Lab 2, Cr 3.

180. Sociolinguistics—Relationships between language and society, emphasizing societal rules or norms that explain or constrain language behavior and functions played by language in human societies. Speech styles and dialects, languages in contact, bilingualism, and the language problems of developing nations. Prerequisite: Ay 2 or Sy 3 and Ay 110, or permission of the instructor. Cr 3.

181. Language and Culture—Introduction to the writings of key figures in the field, exploring their broader implications in such areas as non-linguistic communication, semantics, linguistic relativity, structural anthropology, and general problems in "Cognitive Anthropology." Prerequisite: Ay 2 and IDL 110 or permission of instructor. Cr 3.

190. Topics in Anthropology—An advanced course dealing with specialized problems in anthropology; emphasis on analysis in "frontier" areas of anthropological research. Topics will vary and course may be repeated for credit. Prerequisite: permission of instructor. Cr 3.

191. Teaching Apprenticeship: Preparation—Highly qualified students may design a course under the supervision of one or more members of the department. Each student will propose a course to a sponsoring faculty member who will present it to the entire department for approval. If unanimously approved the student will proceed with designing the course, preparing outlines, bibliographies, lectures, etc. If the course meets the sponsor's approval he will recommend to the department that the student be allowed to teach it in a subsequent semester, normally the one immediately following. The student will be graded on his preparation of the course whether or not it is approved for teaching. Prerequisite: 12 hours of Ay and permission. Cr 1-3.

192. Teaching Apprenticeship: Practicum—A student will teach under the supervision of a sponsoring faculty member a course which he has designed and had approved for teaching in Ay 191. Students who wish to enroll in such a student-taught course will receive credit for it as a division of Ay 197 or 198. Prerequisite: Ay 191. Cr 1-3.

195. Intercultural Understanding—A human relations workshop. The point of view of anthropology, as well as some of the other social and behavioral sciences, is brought to bear upon cultural, ethnic, racial, religious and intergroup conflict in contemporary life. Participants and other resources people will also draw upon their own background and experiences in an attempt to achieve understanding of and adjustment to such human relations problems. No prerequisites. Summer only. Cr 3.

197.198. Department Projects—A special project course in Anthropology initially proposed by the students to the instructor and agreed upon by both of them as to content, scheduling and number of credits. Credits arranged: maximum of 3 hours.

199. Advanced Theory in Social and Cultural Anthropology—A seminar on the selected theorists whose work has had an enduring significance in the development of anthropology. Emphasis on key theoretical approaches behind contemporary work in anthropology, the place of anthropology in intellectual history, and the relationship between anthropology and the other social sciences. Prerequisite: Ay 115 and permission of the instructor. Cr 3.

IDL 200. Seminar in Quaternary Studies—A multidisciplinary seminar concerned with selected areas of study—physical, biological and anthropological—related to the Quaternary Period. Subject areas will vary each semester. Can be taken more than once for credit. Prerequisite: permission of instructor. Cr 2.

IDL 239. "Ice Ages and Mankind"—Introduction to physical, biological and human environments of the Quaternary Period (Roughly past 1.5 million years), with greatest emphasis on the paleoecology and prehistoric archaeology of the past 20,000 years. Special attention is given to productive research approaches in the various fields of Quaternary Studies, and to important recent advances. Prerequisite: Intro. courses in geol., ecol., and anthro. Lec. 3 Cr 3.

270. Seminar in Northeastern North American Prehistory—The prehistory of northeastern North America viewed from an interdisciplinary perspective. Prerequisite: Ay 172 or equivalent and permission. Cr 3.

273. Advanced Methods in Historic Archaeology—A seminar devoted to researching American lifeways of historic periods using archaeological and historical data. Emphasis given to interpreting current UMO excavations. Prerequisite: Ay 174 or Ay 177. Cr 3.

276. Models in Archaeology—A seminar designed to consider current theoretical approaches to archaeology. Prerequisite: Ay 171 or 172 or equivalent and permission of instructor. Cr 3.

297. Advanced Topics in Anthropology—An opportunity for advanced students to study selected topics in anthropology with a staff member. Normally Ay 297 will be taken in the fall semester; Ay 298 in the spring. Prerequisites: Graduate student standing and advanced undergraduates by permission. Credits vary from 1-3. To be arranged with instructor.

Courses in Geography (Geo)

1. Introduction to Human Geography—An introduction to the theory and practice of human geography. Principles of spatial analysis, land and resource use, regionalization, settlement and environmental perception explained in historical, economic, political and behavioral terms. No prerequisite. Cr 3.

10. Geography of Maine—A survey of the spatial relationships and characteristics of places in Maine. After a brief study of the development of Maine's landscapes, attention is focused on land use change and conflict, regional inequalities, locational decision-making, environmental management and planning, and the personality of places. No prerequisite. Cr 3.

101. Historical Geography of North America—The growth of the American economy studied in its spatial aspect as reflected by urban and rural settlement patterns. Particular attention given to three historical "cross-sections"; 1760, 1860, and 1910. Prerequisite: junior standing. Cr 3.

150. The Geography of Canada—The analysis of the physical and human elements and their part in producing the distributional patterns of present day Canada. Regional case studies focusing on current problems and future potentialities. Cr 3.

ART (At)

Professors Lewis (Chairman), Hartgen; Associate Professors Cushing, Decker, Ghiz; Assistant Professors Ebitz, Kelley, Stankiewicz

The B.A. Degree:

The Art Department, as part of the College of Arts and Sciences, offers the opportunity to study studio art and art history within a strong liberal arts curriculum. It is also possible to complete requirements for art teacher certification.

Studio—There are 27 hours of Arts and Sciences requirements to be met from the areas of the social sciences and the natural sciences and mathematics; 48 hours maximum in art (36 studio, 12 art history); and 45 hours electives. It is also possible for interested students to take an enriched studio option (48 hours in studio, 12 hours in art history). The emphasis of the art program is creative studio work in the areas of drawing, painting, graphics, and sculpture. Elective studio work is occasionally available in filmmaking and commercial art. Art history is seen as necessary to intelligent studio development, as is the socializing of the student to the attitudes, philosophies, language, etc., of the contemporary art world.

The Studio degree can lead to (1) specialized work as an artist in one of the fine art areas, (2) graduate study in studio art, (3) art related jobs in commercial art, layout, design. It should be noted, however, that in this specific area we are not competitive with professional commercial art schools.

Art History—The Art Department also offers the B.A. degree in art with a concentration on the history of art. Through study of the chief artistic achievements of man from ancient times to the present in introductory and intermediate survey courses, the concentration develops insight into the nature of architecture, sculpture, painting, and other arts, their interconnections, and relation to their social context. Advanced courses develop a critical understanding of art, explore methodologies for its interpretation and evaluation in the historical context, and offer opportunities for the exploration of special problems. Recognizing that art is essentially a visual rather than verbal experience, two studio courses are required in order to provide insight into the artist's point of view and special problems confronting the artist in the making of art. The concentration is part of an appropriate preparation for a career in museums, galleries, art libraries, arts education, journalism, and other art related contexts, and for further study of art at the graduate level.

The concentration in art history consists of 27 hours of Arts and Sciences requirements in social sciences and natural sciences and mathematics; 36 hours of course work in art history, in art, and, if desired, in other disciplines giving insight into the nature of art and the contexts in which it is made; and 57 hours in electives. The following courses are required:

AtH 5.6	Art Appreciation and History	6 credits
AtH 58	Art Theory and Criticism	3
AtH 197	Topics in Art History	3
*At 1	Drawing I	3
*At 8	Basic 3-D Design	3
		18

*Two more advanced At courses may be substituted depending on student's qualifications.

Six additional elective courses are required, at least four in art history, selected from AtH 40 to AtH 56, AtH 97.98, and AtH 197.198; and the remaining, if any, in Art (At) or in approved courses in other departments (e.g., Anthropology, Foreign Languages and Classics, History, Performing Arts, and Philosophy) not used to meet Arts and Sciences area requirements. The major is encouraged to take AtH 97.98 in order to explore art forms, periods, artists, or issues relating to art not covered in the normal course offerings in art history.

18	credits
36	total

It is also recommended that the major acquire intermediate level proficiency in a foreign language.

The Art Department uses a large collection of slides and reproductions in its teaching program. There is also a year-round program of exhibitions of original works of art sponsored by the University Art Collection.

The B.S. Degree:

Majors in art education follow a curriculum developed in cooperation with the College of Education leading to certification as an art teaching specialist in the State of Maine, grades K-12. This course of study includes: 33 hours College of Education requirements; 22 hours professional education and art education requirements; 33 hours art studio (27 in required courses, 6 in studio electives); 15 hours of art history; and 18 hours of liberal arts electives.

Options in Art Education

Art education today is a field of study and practice which has expanded beyond public school art teaching. Undergraduate study in art education not only prepares a student for certification, but also for graduate work in art education or a related field such as art therapy. Some art education majors choose careers in museum education, community arts education, or other fields which involve working closely with people and art. The Art Department offers several options within the basic course of study in art education. Among these are an enriched studio option, and the Developmental Disabilities Interdisciplinary Concentration in affiliation with the Department of Pediatrics' Child Development Center at Eastern Maine Medical Center and its cooperating agencies. (See the University Affiliated Program, UAP in index). This concentration offers art and art education students an opportunity to develop understanding of the complex factors affecting development and of the value of art in work with the developmentally disabled. Students choosing this option may be preparing to work with mainstreamed students in public school or to go on for graduate study in art therapy. The Developmental Disabilities concentration requires 15 hours of courses in both normal and abnormal development and a 4 credit hour practicum at EMMC or a cooperating agency. These courses are counted as liberal arts electives.

The final option is for students in the B.A. program in the Art Department who may wish to prepare for certification as an art teaching specialist in the State of Maine, K-12. Such students may take the 22 hours of professional education and art education requirements, including student teaching. These are counted towards electives in the B.A. program. Often, students selecting this option must take their student teaching in a ninth semester.

SPECIMEN CURRICULUM FOR B.A. DEGREE IN ART: STUDIO

1st Semester			2nd semester		
At 1	Drawing I	3	At 2	Drawing II	3
At 7	Basic 2-D Design	3	At 8	Basic 3-D Design	3
or			or		
At 8	Basic 3-D Design		At 7	Basic 2-D Design	
	A & S Req., Area I or III	6		A & S Req., Area I or III	6
	Elective	3		Elective	3
		15			15

3rd Semester			4th Semester		
At 10	Intro. to Sculpture	3	At 10	Intro. to Sculpture	3
or			or		
*At 11	Inter. Drawing		*At 12	Figure Drawing	

At 15	Basic Painting	3	At 16	Painting	3
AtH 5	Art Apprec. & History	3	AtH 6	Art Apprec. & History	3
	A & S Req., Area I or III	6		A & S Req., Area I or III	6
		15			15

Take either At 11 or At 12.

5th Semester			6th Semester		
At 9	Intro. to Graphics	3	At 101	Studio Problems	3
AtH	Art History	3	or		
	A & S Req., Area I or III	3	At 33	Inter. Graphics	
	Electives	6	AtH 49	Contemp. Art Forms	3
				Electives	9
		15			15

7th Semester			8th Semester		
At 101	Studio Problems	3	At	Elective (At 101, At 97, At 34, At 81, etc.)	3
	Electives	12		Electives	12
		15			15

SPECIMEN CURRICULUM FOR B.A. DEGREE IN ART: ART HISTORY

Freshman Year

AtH 5	Art Apprec. & History	3	AtH 6	Art Apprec. & History	3
	A & S Req., Area I or III	6		A & S Req., Area I or III	6
	Electives	6		Electives	6
		15			15

Sophomore Year

AtH 40-56	Art History	3	AtH 40-56	Art History	3
At 1	Drawing I	3	At 8	Basic 3-D Design	3
	A & S Req., Area I or III	6		A & S Req., Area I or III	6
	Elective	3		Elective	3
		15			15

Junior Year

AtH 40-56, 97, 98, 197, 198; At, or other approved courses		6	AtH 40-56, 97, 98, 197, 198; At, or other approved courses		6
	A & S Req., Area I or III	3		Electives	9
	Electives	6			
		15			15

Junior Year English Proficiency must be satisfied this semester.

Senior Year

AtH 58	Art Theory & Criticism	3	AtH 197	Topics in Art History	3
	Electives	12		Electives	12
		15			15

SPECIMEN CURRICULUM FOR B.S. DEGREE IN ART EDUCATION

Freshman Year

At 1	Drawing I	3	At 2	Drawing II	3
At 7	Basic 2-D Design	3	At 8	Basic 3-D Design	3
Hy 5	History of Western Europe	3	Hy 6	History of Western Europe	3

Eh 1	Freshman Comp.	3	Eh	English	3
EdA 20	Freshman Early Experience	4	EdA 21	Human Dynamics in Ed.	3
		16			15

Sophomore Year

*At 15	Basic Painting	3	**At 16	Basic Painting	3
AtH 5	Art Apprec. & History	3	AtH 6	Art Apprec. & History	3
At 64	Teaching Mtls. for Art Ed.	3		Math or Science Req.	3
	Math or Science Req.	3	Py	Elective	3
Py 1	Gen. Psychology	3	Sc 2	Fund. of Interpersonal Communication	3
			or		
			Sc 3	Fund. of Public Speaking	
		15			15

*Students wishing to stress sculpture, take At 10 instead of At 15.

**Students wishing to stress sculpture, take At 101 (sculpture div.) instead of At 16.

Junior Year

At 10	Intro. to Sculpture	3	At 10	Intro. to Sculpture	3
or			or		
**At 11	Inter. Drawing		At 12	Figure Drawing	
At 9	Intro. to Graphics	3	*At 101	Adv. Studio Problems	3
Eh	English	3	or		
At 65	Found. & Curr. in Art Ed.	3	At 33	Inter. Graphics	
Th	Theater Course	3	At H 49	Contemp. Art Forms	3
or			At 66	Curr. & Methods in Art Ed.	3
Mc	Music Course			Elective (liberal arts)	3
		15			15

**Take either At 11 or At 12—not both. At 15 should be taken here by sculpture students.

*At 16 for sculpture students.

Senior Year

AtH 58	Art Theory & Criticism	3	At 98	Problems in Art (used as Art elective)	3
AtH	Art History (choose 1 course)	3	EdM 194	Full Day Student Teaching	6
At	Art Elective (At 81, At 101, etc. or courses from other depts. with Art Chairman's approval)	3		½ Semester Electives (liberal arts)	6
	Electives (liberal arts)	6			
		15			15

Courses in Art and Art Education (At)

Most studio courses require that the student purchase a basic supply of necessary tools and equipment.

1. Drawing I—The fundamentals of drawing: creative exercises exploring the principles of line, value, texture, space, and form. Various media and their relationship to expression and composition are also stressed. Lab 6, Cr 3.

2. Drawing II—A continuation of the fundamentals of drawing. Prerequisite: At 1. Lab 6, Cr 3.

7. Basic 2-D Design—Fundamentals of 2-D design through studio experience. Emphasis on pure design. Analysis of design elements, their relationships and organization and basic perceptual and aesthetic aspects of color. Lab 6, Cr 3.

8. Basic 3-D Design—Study of 3-D design principles. Learning fundamentals through studio exercises in form and space utilizing basic media and techniques. Lab 6, Cr 3.

9. Introduction to Graphic Arts—The fundamentals of etching, lithography, relief, and silk screen printing will be discussed, analyzed and investigated through studio experiences. Prerequisite: At 2, 7. Lab 6, Cr 3.

10. Introduction to Sculpture—Study of sculptural form and expression (control and understanding of spatial relationships). Deals with the manipulation of space and materials through bending, forging, carving, casting, and joining. In addition, the students are expected to familiarize themselves with the machines and tools of sculpture. Prerequisite: At 8. Lab 6, Cr 3.

11. Intermediate Drawing—Advanced study of the unique characteristics of various drawing media—charcoal, conte, pencil, ink, silverpoint. Stress will be on the ability to create imaginative and expressive compositions. Prerequisite: At 2. Lab 6, Cr 3.

12. Figure Drawing—Creative drawing based on the human figure. Stress is on understanding the basics of form and structure in human anatomy and incorporating this understanding with technical and aesthetic mastery of drawing concepts. Prerequisite: At 2. Lab 6, Cr 3.

13.14. Fundamentals of Painting—Basic introductions to the painting art. Exercises in color, technique and composition. Studio and outdoor subjects. All media. Prerequisite: At 2 or permission. (Not open to art majors) Lab 6, Cr 3.

15/16. Basic Painting—Exploration of various painting concepts. Stress on composition, color, technical mastery of media, and creative imagination. Prerequisite: At 2, 7. Lab 6, Cr 3.

30. Art Materials and Techniques—Materials, methods, and techniques for the professional artist-craftsman. Examination, comparison, and testing of materials and processes of painting, graphics, sculpture, etc. Prerequisite: At 2 or permission. Primarily for art majors. Lec 2, Lab 1, Cr 3.

31/32. Commercial Art and Publications Design—The design of booklets, catalogs, magazines, newspapers, posters, etc. Exercises in lettering and layout. Prerequisite: At 7 or permission. Lab 6, Cr 3. (Given on sufficient demand.)

33/34. Intermediate Graphic Arts—First semester: relief printing and serigraphy. Second semester: intaglio and lithography. Prerequisite: At 9. Lab 6, Cr 3.

35/36. Advanced Graphic Arts—Study of advanced studio techniques in the various printing media. Stress is on mastery of technical, aesthetic and expressive elements. Prerequisite: At 33/34. Lab 6, Cr 3.

64. Teaching Materials for Art Education—Exploration of educational materials for use in art curricula; design and construction of art education packages; introduction to use of instructional media in art education, including cameras and tape recorders. Required for art education majors. Open to non-art majors by permission only. Lab 2, Cr 3.

65. Foundations and Curriculum in Art Education—History and philosophy of art education; critical examination of goals in art education; theories of child art; introduction to curriculum development for art education; observation of art classes in schools; researching and teaching workshops to peers. Art education majors only. Lec 2, Lab 1, Cr 3.

66. Curriculum and Methods in Art Education—Curriculum design for developing responsiveness to art and personal expression through studio activities; planning and teaching an after-school art program for small groups of children; evaluation of curricula, teaching, and learning for art education. Prerequisite: At 65. Art education majors only. Lec 2, Lab 1, Cr 3.

69. The Teaching of Art—Current methods and materials for the teaching of art in the elementary grades. Theory and actual experience with various two- and three-dimensional art projects. Junior or senior elementary education majors only; or permission. (Not open to art education majors.) Lec 1 and Lab 2, Cr 3.

81/82. Introduction to Filmmaking—Elementary techniques of filmmaking as an expressive art form. Study of the camera and its function, lighting, editing, composition, sound, and film continuity and structure. Stress on the aesthetics of film through study of some outstanding examples of past and present classics. (Student must pay cost of film and processing; other equipment supplied.) Permission. Lab 6, Cr 3.

97.98. Problems in Art—Advanced independent study or research projects in art and related areas. Prerequisite: Juniors and seniors only, and permission of the instructor. Cr Ar.

101. Advanced Studio Problems—Advanced, guided study, for student who has completed introductory and secondary level courses in a given medium. Special problems in technique and creative production. Understanding interdependency of thought and material in artistic expression. Prerequisite: Painting-At 16; Sculpture-At 10; Graphics-At 33. Lab 6, Cr 3.

151. Art Education Workshop and Laboratory—Plan of study, projects and credit arranged. Limited to art education majors.

Courses in Art History (AtH)

3.4. Principles of Art—An analysis of the fundamental premises underlying two-dimensional, sculptural, and architectural art forms. Not an historical survey, although masterpieces are studied. Lec 3, Cr 3.

5.6. Art Appreciation and History—Techniques and trends in architecture, sculpture, and painting as related to the history of art from the earliest times to the present day. Lectures, text, slides, and prints. Lec 3, Cr 3.

40. Classical Art—Survey of the art and architecture of Greece and Rome in their historical context since the beginnings of Aegean civilization to the Christianization of the Roman Empire under Constantine. Prerequisite: AtH 5 or permission. Lec 3, Cr 3. Offered every other year.

42.43. Medieval Art—Survey of the art and architecture of the Middle Ages in their historical context from the Christianization of the Roman Empire under Constantine to the fall of Constantinople in the Eastern Mediterranean, and from the Dark Ages to the waning of the Middle Ages in the West. First semester includes Early Christian and Byzantine art, and Byzantine art in the West. Second semester includes Early Medieval, Romanesque and Gothic art. Prerequisite: AtH 5 or permission. Lec 3, Cr 3. Offered every other year.

44. Italian Renaissance Art—Survey of the major works of painting, sculpture and architecture of the Italian Renaissance in their historical context from the 13th century to the early 16th century. Prerequisite: AtH 5 or permission. Lec 3, Cr 3. Offered every other year.

45. Northern Renaissance Art—Survey of the art of the Netherlands, France, Spain, and Germany in its historical context from Late Gothic of the 14th century to Mannerism of the 16th century. Prerequisite: AtH 5 or permission. Lec 3, Cr 3. Offered on sufficient demand.

46. Baroque Art—Survey of the painting, sculpture and architecture in historical context of the major masters of Mannerism, the Baroque and Rococo in Italy, Flanders, France, Spain, Germany, Holland, and England. Prerequisite: AtH 6 or permission. Lec 3, Cr 3. Offered every other year.

48.49. Contemporary Art Forms—An historical and stylistic survey of art forms from the 18th century to the present. First semester: Neoclassicism through Fauvism. Second semester: Cubism to the present. Prerequisite: AtH 5 and 6 or permission. Lec 3, Cr 3.

50. Western Architecture to the Eighteenth Century—Survey of the materials, structure, function, expression and meaning of western architecture in its various contexts, from the Egyptian pyramid and Greek temple to the Baroque palace and Rococo church. Lec 3, Cr 3. Offered every other year.

51. Modern Architecture and Design—A broad survey of modern European and American architecture and design. Historical building systems and decorations are investigated in terms of their relationship to 20th century achievements in building and engineering. The aesthetic and social ideas of structures, spaces and design are stressed. Key monuments, schools, and major figures are focused on in slides, films and lectures. Special emphasis on urban planning and environmental design. Prerequisite: No freshmen. Lec 3, Cr 3.

52.53. American Art—A broad survey of the arts in America from the 17th century to the present. All aspects of the arts are looked into: painting, architecture, sculpture, graphics, and domestic arts. Lec 3, Cr 3.

54. Islamic Art—Survey of the arts of the Muslim world in their historical context from the Umayyads of the 7th century to the Safavids of the 17th century. The decorative arts will be considered along with Muslim architecture, painting and sculpture in Persia, the Near East, Asia Minor, Egypt, North Africa, and Spain. Prerequisite: AtH 5 or permission. Lec 3, Cr 3. Offered on sufficient demand.

55/56. Primitive Art—Fall semester: African and Oceanic art. Spring semester: North American Indian, Eskimo, Precolumbian Mexican and South American art. Prerequisite: Permission. Lec 3, Cr 3. Offered on sufficient demand.

58. Art Theory and Criticism—Examination and analysis of aesthetic theory and its relationship to the visual arts; study of a wide range of ideas in the development of aesthetic thought with primary emphasis on contemporary theory; application of theoretical systems in the critical analysis of a work of art. Prerequisite: AtH 5 and 6 or permission. Lec 3, Cr 3.

97.98. Problems in Art History—Advanced independent study or research and writing projects in the history of art and related areas. Prerequisite: Juniors and seniors only, and permission. Credit arranged.

197.198. Topics in Art History—Survey of a particular culture, period, artists or artist, or of particular issues in the history of art. Specific topic to be announced. It will vary from semester to semester depending on special interest of faculty member teaching it. The course may be repeated for credit if a different topic is treated. Lec 3, Cr 3. Given on sufficient demand.

CHEMISTRY (Ch)

Professors Dunlap (Chairman), Goodfriend, Green, Patterson, Rasaiah, J. Wolfhagen; Associate Professors Bentley, Georgitis, Jensen, Russ, Zollweg*; Assistant Professors Anderegg, Brajter-Toth; Teaching Associate H. Wolfhagen

*on leave 1980-81

The student majoring in chemistry in the College of Arts and Sciences is able to complete all requirements for certification to the Committee on Professional Training of the American Chemical Society.

The specimen curriculum listed below is a suggested one, and indicates the minimum requirements. Some variation in the order in which courses are taken is possible. For example, the student might begin with Ms 4. Departmental advisers should be consulted for recommended changes.

Chemistry majors who intend to enter medical school should take Animal Biology during the freshman year; they may wish to postpone Physics until the second year. Also, these students may wish to omit some of the starred courses in order to have a wider choice of electives, in addition to the 18 hours of free electives already available within the normal load of five courses per semester.

Course descriptions are listed under the College of Engineering and Science.

A. REQUIRED COURSES

Freshman Year

FALL SEMESTER		Hours	SPRING SEMESTER		Hours
Ch 13	(or 11) Chemical Principles	4	Ch 14	(or 12) Chemical Principles	4
Ms 26	Anal. Geom. and Cal.	4	*Eh 1	Freshman Composition or Equiv.	3
Ps 1	General Physics	4	Ms 27	Anal. Geom. and Cal.	4
	Other	3	Ps 2	General Physics	4
		15			15

Sophomore Year

Ch 140	Analytical Chemistry	4	Ch 152	Organic Chemistry	3
Ch 151	Organic Chemistry	3	Ch 162	Organic Chem. Lab.	2
Ch 161	Organic Chem. Lab.	2	*Ms 59	Differential Equations	4
Ms 28	Anal. Geom. and Cal.	4	**Cs 81	Computer Programming	3
	Other	3	Sc 3	Fund. of Public Speaking	3
				Other	0-3
		16			15-18

Junior Year

Ch 169	Physical Chemistry	4	Ch 170	Physical Chemistry	4
Ch 171	Phys. Chem. Lab	2	Ch 172	Phys. Chem. Lab.	2

*Ch 185	Chem. Literature	2	*Ch 190	Int. Organic Chem. Lab.	3
**Gm 1	Elementary German	3 or 4	**Gm 2	Elementary German	3 or 4
	Other	3-6		Other	3
		14-18			15-16

Senior Year

Ch 154	Adv. Inorganic Chem.	3	*Ch 164	Instrumental Anal.	4
**Gm 3	Intermed. German	3	**Gm 7	Scientific German	3
	Other	9-12		Other	8-11
		15-18			15-18

*Required for certification by the American Chemical Society. Certain substitutions may be permitted.

**Not required for certification, but strongly recommended. Ge 7 or ChE 12 may substitute for Cs 81.

B. OTHER REQUIREMENTS

At least one year of study at the University level of a major foreign language approved by the department. German or Russian is strongly recommended if the student plans to enter graduate school.

At least one course in literature shall be included in the College of Arts and Sciences General Area Requirements.

ECONOMICS (Ec)

Professors Burke, Clark, Coupe, Devino, Duchesneau, Huq, Wilson; Associate Professors Lutz, Overbeek, Wihry (Chairman); Assistant Professors Townsend, Wible

The student majoring in economics in the College of Arts and Sciences must fulfill all the requirements of the College and also complete the following curriculum:

1. Core Requirements
   Ec 10 — Principles of Economics
   Ec 132 — Macroeconomics
   Ec 173 — Price Theory
   One semester of Mathematics: Ms 5 or Ms 13 or Ms 26
   One semester of Statistics: Ms 15 or Ms 18 or Ms 19 or Ms 131
   Note: (a) It is strongly recommended that majors take Ec 132 and Ec 173 immediately after Ec 10.
   (b) Ba 9, Principles of Accounting is recommended for majors.
2. Completion of at least 21 additional hours in economics (Ec) courses. The maximum number of hours in economics courses counting for degree credit is 45 hours.

The department offers an emphasis in the International Affairs program. (See International Affairs in Index).

Courses in Economics (Ec)

10. Principles of Economics—Analysis of the fundamental characteristics and institutions of modern economic society. Problems analyzed include: inflation, unemployment, poverty, resource allocation, international economic inter-relationships, economic growth and development. Cr 3.

120. Humanistic Economics—An introduction to the history and nature of humanistic economics. Primary focus is on the interrelationships between economic institutions and basic human need satisfaction. Analysis on concepts such as economic justice and economic freedom. Comparison of humanistic economics with neoclassical economics and Marxian political economy. Prerequisite: Ec 10. Cr 3.

131. Contemporary Alternatives in Political Economy—Development and critique of alternative contemporary theories of political economy. The course will focus upon alternative political economic paradigms including, among others, the Chicago School, the Cambridge School, Neo-Marxian Economics and Radical Political Economy. Prerequisite: Ec 10. Cr 3.

132. Macroeconomics—An analysis of the basic forces that cause fluctuations in economic activity. The effects on employment, investment, and business firms are thoroughly treated. Stabilization proposals are examined and evaluated. Prerequisite: Ec 10. Cr 3.

133. Labor Markets and Human Resource Development—Labor and manpower in the American economy: labor market dynamics; the structure of labor markets; preparation for employment; labor market problems of special groups; remedial manpower programs; labor markets and public policy. Prerequisite: Ec 10. Cr 3.

134. Economics of Labor Unions—Labor in an industrial society: theory and history of labor movements; comparative labor movements; collective bargaining in the public and private sector; development of public policy toward labor and industrial relations. Prerequisite: Ec 10. Cr 3.

135. History of Economic Thought—A survey of the development of basic economic principles and theories from preindustrial times to present. Major emphasis on the Classical School (Smith, Ricardo, and Malthus) and its critics, the development of the Austrian School, the synthesis of Neo-Classicism, and emergence of macroeconomics. Prerequisite: Ec 10. Cr 3.

136. Marxian Economics—An introduction to scientific socialism. A dynamic macroanalytical critique of the functioning of a capitalist society. Included are theoretical comparisons with orthodox economic theory and an introduction to American radicals (neo-Marxian) and their thought. Prerequisite: Ec 10. Cr 3.

137. Comparative Economic Systems—The structures and operating principles of the major contemporary economic systems are examined and compared. Prerequisite: Ec 10. Cr 3.

138. Economic Development—The theories and practices of interregional and international economic development. Special attention is given to development problems of emerging nations. Prerequisite: Ec 10. Cr 3.

139. International Trade and Commercial Policy—The principles and practices of international trade and finance are thoroughly treated. Special emphasis is given to current trends in the international economy and to United States commercial policy. Prerequisite: Ec 10. Cr 3.

144. Urban Economics—Patterns and processes or growth and structural change within urban areas. The nature and causes of the contemporary crises of urbanized society as reflected in poverty, slum housing, and crime, urban sprawl, traffic congestion, and the pollution of air, soil, and water. Application of tools of economic analysis to public issues such as urban renewal, environmental control, urban housing, urban transportation, financing of urban public services and so on. Prerequisite: Ec 10. Cr 3.

145. Regional Economics—Analysis of a region (country, state, county, city, etc.) as an economic unit. The economics of location, agglomeration, and interregional trade. Empirical tools such as cost—benefit analysis, base studies, input-output tables, and regional accounts. Prerequisite: Ec 10. Cr 3.

153. Money and Banking—The American banking and financial system: monetary theory and policy and a detailed study of selected subjects in money and banking. Prerequisite: Ec 10. Cr 3.

IDL 158. Culture and Economic Development—The interface between cultural anthropology and economics, especially as these disciplines shed light on problems of economic change in the societies of the Third World. Prerequisite: Ec 10, Ay 2, or permission. Cr 3. (Same as Ay 158.)

160. Bioeconomics—The problems created by the exploitation of commonly owned renewable resources. Case studies and theory will focus on economic aspects of New England's commercial fisheries, especially as they relate to the more general problems of pollution, limits to growth, regulation of economic activity, etc. Emphasis is on the interaction of biological and economic phenomena. Students will be required to do some elementary reading in population biology. Prerequisite: Ec 10. Cr 3.

168. Social Control of Business—The nature and structure of American industry, with particular emphasis upon governmental regulation of competition and monopoly. Prerequisite: Ec 10. Cr 3.

171. Public Finance and Fiscal Policy—Public expenditure theory; principles of taxation; the federal budget and alternative budget policies; federal tax policy; fiscal policy for stabilization; federal debt. Prerequisite: Ec 10. Cr 3.

172. State and Local Government Finance—Development of the federal system; fiscal performance; intergovernmental fiscal relations; state and local revenue systems; budgetary practices; state and local debt. Prerequisite: Ec 10. Cr 3.

173. Price Theory—The theory of consumer behavior, markets, the firm, and distribution are treated. Prerequisite: Ec 10. Cr 3.

174. Economic Policy—Current economic problems in national and international levels. Prerequisite: senior standing Cr 3.

175. Industrial Organization—The relationship between market structure, conduct and performance. Also, the development of a general analytical framework to permit an assessment of performance in existing markets. Current public policy in this area is evaluated in the framework of the above analysis. Prerequisite: Ec 173 Cr 3.

176. Economics of Technological Change—Focuses on the manner in which new products and processes are created and adopted and on their impact on the United States economy. Economic and managerial studies of the research and development process, the nature of innovation, and the innovation diffusion process are discussed. National policies toward science and technology are analyzed in terms of adequacy and efficiency. Prerequisite: Ec 10. Cr 3.

180. Introduction to Mathematical Economics—Mathematics is used as a language in presenting concepts of economic theory. Prerequisite: Ec 132, 173; Ms 6 or 12. Cr 3.

185. Introductory Econometric Model Building—Statistical estimation of economic relationships has become widespread in the scholarly economic literature and as an input into the policy making process in industry and government. Without use of calculus or matrix algebra, econometric estimation techniques and problems will be investigated. Prerequisites: Ec 10, Ms 13, and Ms 19. Cr 3.

191. Field Experience in Economics—Supervised employment with relevance to the study of economics in either the public or private sector. Supervision by instructor of student's choosing. Requirements include initial proposal showing relevance of job to economics and final report or paper. Prerequisite: One-hundred level economics course in relevant area of work. Cr 3 per experience.

199. Readings in Economics—Supervised readings or research in economics. Course intended to supplement regular course offerings when outstanding students request closely supervised individual readings or research. The subject matter cannot normally duplicate that of a course regularly offered by the department. Junior or senior standing is required. Prerequisites: Ec 10 and permission of instructor. Cr 3.

Graduate Courses (Ec)

210. Micro-economic Theory—Cr 3.

211. Macro-economic Theory—Cr 3.

229. Readings in Economics—Cr 3.

IDL 230. (Ec, ARE) Econometrics—Cr 3.

250. Seminar in Economic Policy Analysis—Prerequisite: permission. Cr 3.

260. Seminar in Common Property Economics—Prerequisite: permission. Cr 3.

265.266. Research Seminar in Applied Economics—Cr 6.

270. Alternative Approaches to Economic Theory and Policy—Prerequisite: permission. Cr 3.

399. Graduate Thesis—Cr 6.

ENGLISH (Eh)

Associate Professor MacKnight (Chairman); Professor Sprague (Department Graduate Studies Chairman); Associate Professor Burnes (Chairman of College Composition); Professors Bennett, Carlson, Hunting, Manlove, Terrell; Associate Professors Bauschatz, Brogunier, Brucher, Cathcart, Evans, Hatlen, Urbanski, Wicks, Wilson; Assistant Professors Andersen, Fraustino, Kail, Lecker, Steinhoff; Instructors Estela, Levesque, Perkins; Cooperating Associate Professor Schuman; Cooperating Associate Professor Fritsche

The Department of English offers a variety of courses in literature and writing, as well as specialized courses dealing with language and teaching. The skills that these courses develop include reasoning, persuasion, logical analysis, evaluation, the development of human values, and communication, all of which arise from an integrated program of reading, writing, and discussing. An English major may go on to a field such as teaching, publishing, or journalism, and English is also a valuable pre-professional major for such diverse fields as law, medicine, business, and federal service. English is very attractive as a double major, too, as communication skills are important in all other disciplines.

English majors may choose a regular literature program or may elect to concentrate in creative or expository and technical writing.

English Major Requirements

The English major must take a minimum of 36 hours of English (Eh) courses but may take as many as (but no more than) 48 hours.

(1) All majors shall be required to take 36 hours of English (Eh) courses such that at least *six* hours fall within *each* of the categories listed below.
   (a) Courses in writing beyond Eh 1, one of which must be Eh 76;
   (b) Courses in literary history and surveys of literature;
   (c) Courses in authors studied in detail;
   (d) Courses in genres;
   (e) Courses in critical, pedagogical, or linguistic theory.

   Since the substance of a particular course may change from year to year, the chairman of major advisers shall be responsible for determining which courses fit which categories. In no case, however, may a course be allowed to fulfill more than one requirement.

(2) All English majors must take at least 15 hours of work at the 100 or 200 level, at least three hours of which must be at the 200 level.

(3) English majors must demonstrate foreign language proficiency at the intermediate level either by examination (administered by the Department of Foreign Languages) or by satisfactorily completing two years (four semesters) of foreign language study.

(4) IDL 110 and IDL 111 count toward the 36-hour major.

(5) Eh 1 does not count toward the 36-hour major, but it does count toward the maximum 48 hours allowed in English courses for degree credit.

(6) English majors who elect the Concentration in Creative Writing or the Concentration in Expository/Technical Writing shall be required to take 36 hours in English (Eh) courses, with a minimum of:
   (a) Courses in writing beyond Eh 1 ..... 12 hours
   (b) Courses in literary history and surveys of literature ..... 6 hours
   (c) Courses in authors studied in detail ..... 6 hours
   (d) Courses in genres ..... 6 hours

   By the end of the first eight weeks of his final semester, the student who has elected the concentration in creative writing is to submit as part of his or her work a book-length manuscript prepared as if for publication. Preparation and writing of this manuscript may be part or all of the student's work in Eh 101 Directed Writing.

Graduate Study

The department offers the Master of Arts degree in English. Candidates for this degree may choose either of two programs: a thesis program of 30 hours (24 in course work and 6 of thesis), or a non-thesis program of not less than 30 hours of course work. Within the non-thesis option, the student may elect a Concentration in Composition designed for those wanting to pursue careers in community college teaching, as well as those wanting to go on to Ph.D. work in the teaching of writing. For further details, see the Graduate School Catalog.

Courses in Writing

Placement in Eh 1: Most University students are required to earn three credits in Eh 1. They may do so in a variety of ways. Students with average English Achievement scores enroll in the regular divisions of Eh 1 and receive credit by fulfilling course objectives. Students with above average scores write a placement essay, on the basis of which some are granted credit by examination, some are placed in Eh 1 (A), the seven-week division of the course, and some are placed in the regular divisions of the course. Students with low English Achievement scores

write a diagnostic essay on the basis of which some are required to enroll in Eh 1 (t) as a prerequisite for Eh 1 and some are allowed to move directly into Eh 1. Students who qualify for either the placement or the diagnostic test are notified by the department of English during the summer before they enter the university.

1. College Composition—An introductory course in college writing in which students review basic principles of grammar and usage and learn through practice the ways in which writing serves to expand, clarify, and order experience and knowledge. Particular attention is given to analytic and persuasive writing tasks to prepare students for the kinds of writing required in college courses. Cr 3.

1 (t). Writing Workshop—The Writing Workshop is a course for students who need to develop and to practice the basic writing habits necessary for successful university-level writing. The course is taught largely on an individual basis in the English department's writing lab. Students will be selected on the basis of their English Achievement scores and a written placement test, or on the recommendation of faculty members. Successful completion of the course will qualify the students for enrollment in Eh 1. 3 semester credit hours (do not count towards graduation).

1 (a). College Composition, Advanced—A seven-week course in college writing in which students learn through practice the principles of analytic and persuasive writing. Cr. 3.

7. Intermediate Composition—An intermediate course in composition for students wanting practice in those forms of expository, analytical, and persuasive prose required in the writing of essay test questions, term papers, research projects, and extended arguments. Ordinarily, students will be encouraged to write on topics from their own disciplines. Prerequisites: Eh 1 and at least sophomore standing. Cr 3.

8. Descriptive and Narrative Writing—A course in the writing of descriptive and narrative prose with special emphasis on the informal essay. Prerequisite: Eh 1 or equivalent. Cr 3.

10. An Introduction to Creative Writing—An introductory course in the writing of prose fiction with special emphasis on principles of story development, characterization, and point of view. Prerequisite: Eh 1 or equivalent. Cr 3.

17. Advanced Professional Exposition—Supervised practice in the writing of technical and business reports, professional correspondence, and related materials. Prerequisites: Eh 1 or equivalent and junior or senior standing. Cr 3.

76. Advanced Composition—A course in exposition and argument that combines a study of rhetorical theory and practice in developing a command of various expository styles. Students working on manuscripts are welcome, but prior commitment to a project is not a requirement. Required of English majors. Prerequisites: Eh 1 and 7, or permission of the instructor. Cr 3.

77. Writing Fiction—A course in the writing of fiction, for students of demonstrated ability. Prerequisite: Eh 7 or 10, or permission of instructor. Cr 3.

78. Writing Poetry—A course in the writing of poetry, for students of demonstrated ability. Prerequisite: Eh 7 or 10, or permission of instructor. Cr 3.

101. Directed Writing—Supervised practice in the writing of the novel, drama, short story, poetry, essay, literary criticism, technical or professional writing. Individual projects for students with demonstrated ability in writing. Credit earned is dependent on amount of writing agreed upon in advance with the instructor. May be repeated for credit with permission of the instructor and the department chairman. Prerequisite: by permission only. Cr 1, 2, or 3.

Undergraduate Courses in Literature

3. Introduction to Language and Literature—The role of language and literature in human consciousness and action. Students will examine the basic elements of expressive and persuasive discourse by studying not only such traditional modes as poetry and fiction but also such contemporary ones as advertising, film, and the political essay. Eh 3 may be taken before or after Eh 1. Cr 3.

4. Introduction to the Drama—Close reading and analysis of about a dozen to fifteen masterpieces of the drama. Prerequisites: open to freshmen; no senior A & S English majors; Eh 1 is strongly recommended, though not a prerequisite. Cr 3.

5. Introduction to Poetry—A systematic progression through the various kinds of poetry (lyric, narrative, elegiac, occasional; the sonnet, the ode, the epic; etc.) and an examination of

the techniques (rhythm, pattern, sound, tone, imagery, metaphor, allusion, for example) used by poets of note. Prerequisite: open to freshmen; no A & S senior English majors; Eh 1 is strongly recommended, though not a prerequisite. Cr 3.

6. Introduction to Fiction—Careful reading and discussion of selected short stories, novellas, and novels. By considering the elements of fiction such as theme, character, plot, image, and point of view, students increase their ability to understand and appreciate the art of fiction. Prerequisites: open to freshmen; no A & S senior English majors; Eh 1 is strongly recommended, though not a prerequisite. Cr 3.

9. Literature and the Modern World—An examination of the modern sensibility as it has manifested itself in literature. Some attention also to the history of the 20th century and to the music, visual arts, social thought, and science of the contemporary epoch. Prerequisite: Eh 1 is strongly recommended. Cr 3.

11.12. The Western Tradition in Literature—Survey of the major writers in the Western literary tradition. The development of our cultural heritage and the evolution of major literary forms. Semester I: Homer through the Renaissance. Semester II: Neoclassicism to the 20th century. Recommended for English majors. (This course is identical with Fl 11.12.) Cr 3.

21.22. English Literature: An Introductory Survey—Semester I: English literature from the beginnings through the Age of Johnson. Semester II: English literature from the Romantics to the present. Offers students a broad view of the major patterns of development within the English literary tradition, with emphasis on the cultural and historical forces which have shaped this tradition. Recommended for English majors. Prerequisite: 3 hours of literature or permission. Cr 3.

43.44 American Literature—Semester 1: American literature from Colonial times to the American Renaissance. Semester 2: American literature from the Rise of Realism to the present. Recommended for English majors. Prerequisite: 3 hours of literature or permission. Cr 3.

57. Shakespeare: Selected Plays—A study of ten to twelve plays, selected to represent the range of Shakespeare's achievement as a playwright. Recommended for non-majors, as well as for those majors who want to study Shakespeare in a one-semester course. Not open to students who have taken Eh 157 or 158. Prerequisite: 3 hours of literature or permission. Cr 3.

61. Writers of Maine—The Maine scene and Maine people as presented by Sarah Orne Jewett, E. A. Robinson, Edna St. Vincent Millay, Mary Ellen Chase, R. P. T. Coffin, Kenneth Roberts, E. B. White, and others. Prerequisite: 3 hours of literature or permission. Cr 3.

79. American Short Fiction—A study of genre, form, and theme in representative works of American short fiction from Irving to the present. Prerequisite: 3 hours of literature or permission. Cr 3.

90. Topics in Literature—Topics are announced well in advance when the course is to be offered. Recent topics have included: the major themes of science fiction, the supernatural, and literature of the third world. (Not offered every semester.) Prerequisite: 3 hours of literature or permission. Cr 3.

Advanced Undergraduate Courses in Literature

(Graduate students are reminded that courses numbered 100 to 199 may be used for graduate credit only if prior approval has been given by the graduate student's advisory committee.)

130. Studies in European Literature—Varies in content from generic studies (the novel, the drama) to period studies (the Renaissance, Neo-Classicism). Prerequisite: 6 hours of literature or permission. (This course is identical with Fl 130.) Cr 3.

135. Canadian Literature—An examination of the development of Canadian literature from 1850 to the present. Interpretation and analysis will be devoted to the poetry and prose of major literary figures. The course will also examine the impact of British and American models upon the tradition of Canadian literature. Prerequisite: 6 hours of literature or permission. Cr 3.

143. The American Romantics—Major works of such early and mid-19th century writers as Irving, Bryant, Cooper, Emerson, Thoreau, Whitman, Poe, Hawthorne, and Melville. Prerequisite: 6 hours of literature or permission. Cr 3.

144.145. The American Novel—Semester I: Major novels by Cooper, Hawthorne, Melville, Twain, James, Howells, and others. Focus on thematic and technical developments in the

American novel in the 19th century, with some attention to its portrayal of the newly forming national culture and character. Semester II: Major novels by Dreiser, Fitzgerald, Faulkner, Hemingway, Wolfe, Mailer, and others in the 20th century, focusing on thematic developments and narrative innovations that moved the American novel beyond national boundaries and made it a major Western literature. Prerequisite: 6 hours of literature or permission. Cr 3.

146. American Poetry—Concentrates on the major American poets. One third of the course is devoted to the 19th century and earlier. The last two thirds covers the 20th century: Robinson, Frost, Pound, Eliot, Williams, Stevens, H. Crane, and selected contemporary poets. Prerequisite: 6 hours of literature or permission. Cr 3.

147. American Drama—A study of major works, with an emphasis on the 20th century. Reading and discussion of such playwrights as O'Neill, Williams, Miller, and Albee. Prerequisite: 6 hours of literature or permission. Cr 3.

148. Major American Writers—This course enables the student to study in depth some major American writers, from the 18th century to the present, during a semester. Depending on the professor and the semester offered, the class will study from one to three major American novelists, poets, or dramatists for their achievements in and contributions to literature. Prerequisite: 6 hours of literature or permission. Cr 3.

153. Chaucer—The major focus is on *The Canterbury Tales*, all of which are read in this course. Prerequisite: 6 hours of literature or permission. Cr 3.

157/158. The Works of Shakespeare—Semester I: non-dramatic poetry and plays, 1592-1600. Semester II: plays, 1601-1613. Prerequisite: 6 hours of literature or permission. Cr 3.

159. Renaissance Poetry and Prose—Readings in lyric and narrative poetry from Wyatt through Marvell, with special emphasis on Spenser, Jonson, and Donne, and on the prose of such writers as Hooker, Donne, Bacon, and Browne. Prerequisite: 6 hours of literature or permission. Cr 3.

161.162. British Drama—Semester I: Shakespeare's contemporaries, with some attention to drama before and after Shakespeare. Semester II: a survey from the Restoration (1660) to the present. Prerequisite: 6 hours of literature or permission. Cr 3.

164. Milton—The poetry and prose, with attention to the literary and historical background. Prerequisite: 6 hours of literature or permission. Cr 3.

166. The Age of Swift and Pope—The prose and poetry of the major writers: Dryden, Pope, and Swift; the minor writers: Butler, Pepys, Defoe, Addison, Steele, and Gray. Prerequisite: 6 hours of literature or permission. Cr 3.

168. Johnson and His Circle—A study of the major works of Samuel Johnson and his contemporaries: Boswell, Goldsmith, Gibbon, Reynolds, Burke, Garrick, Mrs. Thrale, and Fanny Burney. Some attention given to the beginnings of Romanticism. Prerequisite: 6 hours of literature or permission. Cr 3.

173. Literary Criticism—Selected readings in literary theory and criticism from Aristotle to the present. Prerequisite: 6 hours of literature or permission. (This course is identical with Fl 173.) Cr 3.

169.170. The English Romantics—The works of the major poets, with some attention to their critical writing and the historical and intellectual context provided by their contemporaries. Semester I: Blake, Coleridge, Wordsworth; Semester II: Byron, Shelley, Keats. Prerequisite: 6 hours of literature or permission. Cr 3.

181.182. The English Novel—Semester 1: the principal novelists from the beginnings to Jane Austen. Semester 2: from Dickens to Hardy. Prerequisite: 6 hours of literature or permission. Cr 3.

187.188 The Victorians—Semester I: poetry, focusing on Tennyson, Browning, Arnold, the Pre-Raphaelites, the Aesthetes, and Yeats. Semester II: prose, focusing on the major issues and ideas, especially in Carlyle, Newman, Mill, Darwin, and Pater. Prerequisite: 6 hours of literature or permission. Cr 3.

189. Twentieth Century British Literature—Reading and discussion of such great 20th century writers as Yeats, Joyce, Conrad, Auden, Beckett, Woolf, and Pinter. Prerequisite: 6 hours of literature or permission. Cr 3.

190. Topics in Literature—Topics are announced well in advance when the course is offered. Recent topics have included Virginia Woolf and the Bloomsbury Group, Tolkien and Modern Fantasy, and Women's Literature. (Not offered every semester.) Prerequisite: 6 hours of literature or permission. Cr 3.

Graduate Courses in Literature (Eh)

English majors must take at least three hours in courses at the 200 level, all of which are open to advanced undergraduates. For descriptions of the courses below consult the Graduate School Catalog.

201. Studies in Old English Literature—Cr 3.

203. Studies in Medieval Literature and Language—Cr 3.

204. Studies in Shakespeare and his Contemporaries—Cr 3.

205. Studies in Renaissance Poetry and Prose—Cr 3.

207. Studies in Eighteenth Century Literature—Cr 3.

208. Studies in Romantic Literature—Cr 3.

209. Studies in Victorian Literature—Cr 3.

210. Studies in Twentieth Century British Literature—Cr 3.

211. Studies in American Literature: Colonial through Romantic—Cr 3.

212. Studies in American Literature: Realistic and Naturalistic—Cr 3.

213. Studies in American Literature Since World War I—Cr 3.

215. Literature of Maine and the Atlantic Provinces—Cr 3.

290. Studies in Literature—Cr 3.

297. Bibliography and Methods of Research—Cr 2.

301. Seminar: Medieval Topics—Cr 3.

305. Seminar: Sixteenth Century Topics—Cr 3.

306. Seminar: Seventeenth Century Topics—Cr 3.

307. Seminar: Eighteenth Century Topics—Cr 3.

308. Seminar: Nineteenth Century Topics—Cr 3.

311. Seminar: Topics in American Literature before 1900—Cr 3.

313. Seminar: Twentieth Century Topics—Cr 3.

350. Independent Reading—Prerequisite: 6 hours of graduate study in English. Cr 1 or 2.

390. Topics in Literature and Linguistics—Cr 3.

399. Thesis—Cr Ar.

GS 399. Reading for Master's Comprehensives—Cr 1.

Courses in Linguistics and in the History of the English Language

IDL 110. (Ay, Eh, Fl) Introduction to the Study of Linguistics—Survey of language structure and its socio-cultural, psychological, and historical aspects. Provides the student with conceptual and technical tools for understanding the phenomenon of language. No previous training in languages or linguistics is required. Cr 3.

IDL 111. (Eh, Sy). Language and Social Control: the Theory and Practice of Human Discourse—Examines the ways in which language serves the functions of communication and social control. Theoretical groundwork is provided by readings in the sociology of knowledge, socio-linguistics and linguistics. Exercises in several modes of written communication: the analytic, the interpretive, the advocative, and the personal. Students taking this course will satisfy the writing requirement for majors in Sociology. Prerequisites: Sy 3, Eh 1, or permission of the instructor. Cr 3.

111. History of the English Language—Main aspects of the development of Modern English from Old and Middle English; words and their backgrounds; changes in sound, form, and meaning. Prerequisite: IDL 110 or equivalent. Cr 3.

121. Modern Grammars—Generative-transformational grammar of English, with emphasis on syntax and semantics. Attention is given to the relation of transformational and structural grammar. Prerequisite: IDL 110 or equivalent. Cr 3.

Courses in the Teaching of English

104. Teaching of English in the Secondary School—A discussion of principles and practices in the teaching of literature, language, and composition, with exercises in theme correction. Prerequisite: 15 hours of literature. IDL 110 recommended. Cr 3.

105. Workshop for Secondary School Teachers of English—Lectures by staff and eminent specialists in reading, composition, language, and literature. Designed for experienced secondary school English teachers who want to enrich their backgrounds in their subject matter. Enrollment limited to 25 students. Course given in Summer Session only. Cr 3.

195. The Teaching of Composition in the Secondary School—Principles and practices of teaching composition in high school. Current trends and problems in student writing, and traditional and new methods to deal with them. Composition to be considered as an integral part of the student's experience, not just in the English classroom. Cr 3.

295. Theories of Composition—A study of rhetorical, stylistic, and cognitive perspectives, from classic formulations to current research, on the nature of written composition and issues in composition teaching. Non-majors welcome. Cr 3.

395. Teaching College Composition—A study of the theory and practice of composition teaching in college, this course is required of but not limited to all teaching assistants in the department of English. Students read widely in current composition theory, paying particular attention to studies of the composing process, of the aims and modes of academic prose, and of ways of evaluating writing. Cr 3.

Field Experience Course

95. English Apprenticeship—Students work with business, professions, or other organizations approved by the department as appropriate to an apprenticeship program. The work in the course varies with each student enrolled and with the needs of the cooperating employer, but normally involves either research, public relations, reporting, rewriting, interviewing, indexing, or other allied activity requiring skill in reading, writing, and in the perception encouraged and developed by a concentration in English. Prerequisite: 24 hours in English, including Eh 7 or Eh 17; and permission. A special section of Eh 95 will be designated "Peer Tutoring." The prerequisites for this section are submission of a writing sample and the permission of the instructor. May be repeated for credit up to 6 credit hours.

FOREIGN LANGUAGES AND CLASSICS

Professor Carroll, (Chairman); Professors Rioux, Roggenbauer; Associate Professors Delphendahl, Gutman, Hayes, L. Luszczynska, R. Luszczynski, Singerman, Small, Tatem, Troiano, Zollitsch; Assistant Professors Brimmer, Hall, Pellón, Pyles; Lecturer Herlan; Graduate Assistants McHenry, Markides, Nelson, Veilleux

Several departments of the College of Arts and Sciences have special language requirements or recommendations:

Several departments of the College of Arts and Sciences require successful completion of six credit hours of a foreign language. Listed below are the departments and their foreign language requirements or recommendations:

ANTHROPOLOGY: Intermediate language proficiency.

CHEMISTRY: One year of either French, German or Russian.

COMPUTER SCIENCE: The intermediate level of a foreign language is strongly *recommended.*

ENGLISH: Establish proficiency.

GEOLOGY: Students contemplating graduate work are *strongly encouraged* to take either French, German or Russian.

JOURNALISM: One year of a foreign language which can be either the continuation of the language taken in high school or a brand new language.

MATHEMATICS: The intermediate level of a foreign language is *strongly recommended.*

MUSIC: One year of a foreign language which can be either the continuation of the language taken in high school or a brand new language.

PHYSICS: One year of a foreign language is recommended for the B.A. degree, two years for the M.A.

POLITICAL SCIENCE: Only in International Affairs.

SOCIOLOGY: *Recommended* if going on to graduate school.

SPEECH COMMUNICATION: A six (6) hour sequence in foreign languages or linguistics.

ZOOLOGY: Proficiency at the intermediate level.

In addition, the humanities requirement of the College of Arts and Sciences may be fulfilled with a foreign language. Students who have presented two years of a high school foreign language for admission will *not* receive credit for an *elementary* course in that particular language unless *five* years have passed between the last language study and admission to the undergraduate study. The Department recommends that these students take:

A. an intermediate or advanced course in the language studied in high school (credits earned in those courses count towards the advanced course credits in the humanities category)

OR

B. an elementary course in a new language (credits earned here count towards the introductory course credits in the humanities category).

Any language course (except for elementary courses in the student's high school foreign language) can of course be taken for credit as an elective.

Credits are awarded on a semester basis.

Finding the appropriate level at which to take a language course is essential for success.

During the first week of the fall semester the Foreign Language Placement Examination will be given free of charge to all freshmen in the College of Arts and Sciences for purposes of both placement and credit. If you are planning to satisfy a portion of the humanities requirement by continuing a foreign language taken in high school, you must take the Language Placement Examination.

If you wish to start a new language, you need not take the Placement Examination. However, if you decide at a later date to continue in a language you have already taken, you must take the Placement Examination, at your own expense, through the Testing Center.

How do you receive credit by examination?

(1) If your score on the Placement Examination is sufficiently high (see table following), you will receive three (3) hours of degree credit equivalent to the first semester of the intermediate course.

(2) As an incentive to continue your language study, you are eligible to receive an additional three (3) credit hours equivalent to the second semester of the intermediate course by skipping the intermediate course and passing with a grade of B or better two semesters of language study beyond the intermediate level. For example, if you were to score 580 on the French examination, you would receive three (3) credits equivalent to French 3. You then have the choice of taking French 4 or you may skip French 4 and take French 5 and French 9 or10, or an advanced course. If you complete three courses with a B grade or better, then you will receive an additional three (3) credit hours equivalent to French 4.

IF YOU TAKE FRENCH 3 OR 4 FOR CREDIT THEN YOU CANNOT RECEIVE CREDIT FOR THESE COURSES BY EXAMINATION.

(3) If you score extremely high (see table below), you will receive six (6) hours of credit equivalent to the intermediate course. It is highly recommended that you continue to take advanced courses in the language for which you have demonstrated considerable proficiency.

Language Exam	Score Range	
	3 hours credit	6 hours credit
French	550-670	680 or above
German	560-670	680 or above

Russian	**560-690**	**700 or above**
Spanish	**550-710**	**720 or above**
Latin	**560-670**	**680 or above**

How is the examination score used for placement?

For students who score below the level for which credit is given, the examination results will be used to place you in the appropriate level course.

If you do poorly on the examination and wish to continue in the same language, you may take the elementary course for NO CREDIT, followed by the intermediate course for credit.

Alternatively, you may elect to start a new language for credit.

ADVANCED PLACEMENT

The Foreign Language and Classics Department accepts *Advanced Placement Examinations* in Foreign Language and Literature for degree credit. Scores of 4 and 5 on either exam will receive six credits; scores of 3 will receive three credits.

Students may major in the following fields: French, German, Spanish, Romance Languages, Modern Languages, Latin, and International Affairs.

A. General requirements for majors in Foreign Languages:

1. Demonstration of listening comprehension, oral, reading and writing proficiency (students who have not received at least B in Fr 5 or 6, or Gm 5 or 6, or Sp 5 or 6 may be required to take a test in language skills), and
2. Demonstration of comprehensive coverage of literature and civilization through successful completion of appropriate course work, and
3. Beyond the intermediate level in French: 33 hours; in German and Spanish: 30 hours.

B. Special requirements for majors in:

French — 21 hours of 100 level French courses, 15 hours of literature and civilization in French, 3 hours of French or French-Canadian Civilization. Hy 5.6 History of Western Europe and/or Hy 122 Modern France are highly recommended.

German — A survey course, Gm 11, 12 (or equivalent), 15 hours of 100 level German courses, and Hy 5.6, History of Western Europe. Hy 125. 126 History of Modern Germany is highly recommended.

Spanish — 18 hours of 100 level Spanish courses, Hy 5.6 History of Western Europe, or Hy 147. 148 Hispanic America are highly recommended.

Romance Languages — A minimum of 30 hours in French and Spanish beyond the intermediate level, at least 24 or which must be in 100-series; a minimum of 12 hours above the intermediate level in *each* of the two languages must be taken.

Modern Languages — A minimum of 30 hours beyond the intermediate level, representing a combination of either a Romance language and German, a Romance language and Russian, or German and Russian. A minimum of 12 hours above the intermediate level must be taken in *each* of the two languages and at least 18 hours must be in 100-series courses.

Latin — A minimum of 24 hours in the subject matter field beyond the intermediate level. Lt 47.48 should be taken in the junior year or earlier, if possible. In addition, majors are required to complete successfully 18 hours in two or more related disciplines in Arts and Sciences, including other languages and courses in translation offered by the department. Students intending to pursue Classic Studies should also take 6 hours in Greek and Cl 1.2

Interdisciplinary studies—

a) Students may combine a specialization in French, German, Latin, Russian or Spanish with a program of Interdisciplinary Studies in the Humanities and Fine Arts. In such cases a program of 24 hours (instead of 30) in French, German, Latin, Russian or Spanish is combined with 24 hours of related work in Art, English, History, Music, Philosophy and Speech, (for details see Special Programs).

b) B.A. in French (North American option)

Students may combine a program of 24 hours in French beyond the intermediate level with 18 hours of related work in three of the following departments:

Anthropology:	Ay 122; 160; 180; Geo 150
English:	Eh 190, 292
History:	Hy 157, 159; 160; 221
Sociology:	Sy 131
CAN I:	Introduction to Canadian Studies

In addition, students are required to take Fr 140 or Fr 56

c) Linguistics Cluster (See Interdisciplinary Concentrations in Index)
Students may combine a program of a minimum of fifteen hours distributed as follows:

I. **Core**. At least three courses must be completed in this category, one from each subcategory.
   A. **Introduction**
      IDL 110 — Introduction to Linguistics
   B. **Language Structure**
      FL 153 — Phonology
      Eh 121 — Syntax
   C. **Language in Context**
      Ay 180 — Sociolinguistics
      Ay 181 — Language + Culture
      Sc 180 — Language + Speech Development

II. **Electives.** To reach or go beyond, the fifteen credit minimum, students may choose courses in this category. The enumeration here is not definitive; new courses, projects, special seminars, or pertinent readings in upper honors courses may be approved for the program.
   Eh 111 — History of the English Language
   Fr 120 — French Phonetics
   Fr 200 — History of the French Language
   Fr 210 — French Linguistics
   Ms 141 — Mathematical Logic
   Pl 50 — Philosophy of Language
   Pl 131.132 — Logic (I + II)
   Cs 181.182 — Introduction to Computer Science (I + II)
   Cs 186 — Programming Languages
   Sc 184 — Basic Research in Speech + Hearing Science

Note that the three areas — Humanities, Social Sciences, Natural Sciences — are represented among the courses listed for this program. Students may therefore satisfy area requirements by selecting courses from this list.

International Affairs (in Foreign Languages) — Students may combine a program of 24 hours in French, German, Russian, or Spanish with appropriate studies in other fields for a major in International Affairs. (See Index.)

Teacher preparation — In addition to meeting the major requirements in foreign languages, students desiring certification must complete the following:

1. 18 hours, including the introductory course, in a second subject commonly taught in high schools
2. An advanced grammar course (Fr 100, Gm 100, Sp 100, Ru 100)
3. A civilization course (Fr 157.158, Gm 102, Sp 157/158)
4. Fl 166 The Teaching of Foreign Languages
5. EdB 2, Edb 3, EdB 4, EdM 191 Student Teaching

and, in the case of French majors only: Fr 199 Applied French Linguistics, Fr 120 French Phonetics. Students should also register with the College of Education as teacher candidates before the end of the sophomore year.

Study Abroad—Students majoring in a foreign language are encouraged to spend a summer, a semester, or an academic year in a previously approved program of study at a foreign university as a part of their program. Consult the chairperson of the department regarding these possibilities. The Foreign Language Department, in cooperation with the Canadian-American Center, sends students in the Canada Year program from Orono to Canadian universities. In past years, UMO students have attended McGill, l'Université Laval, l'Université du Québec and other schools in Canada. Interested candidates should apply to Canada Year, Canadian-American Center, 160 College Avenue.

The University is affiliated through the Universities of New Hampshire and other Land Grant Universities of New England with a Junior Year Abroad Program in Salzburg, Austria; through CIEE (Council on International Education Exchange) with a year or semester abroad study program at Rennes, France and Seville and Cadiz, Spain. Students are able to study in Mexico City through the Northeast Consortium for Study in Mexico.

A credit transfer arrangement exists with the Universities of Avigon, and Aix-en-Provence, France, and with the University of Kent in England and a direct exchange of qualified freshmen (2nd semester) with advanced students is sponsored in several German Gymnasien.

Arrangements for studies in Canada, e.g., at the Universities of New Brunswick, Nova Scotia, and Quebec, can be made through the Canada Year Program.

Up to 36 credits may be earned through these programs, pending previous consent of the Dean, and the department chairperson involved.

Total immersion programs in French in Quebec, in German and in Spanish at Owls Head, Maine are offered during the May Term (Fr, Gm, Sp, 97); 3 credits per program.

Graduate Study — The department also offers work leading to the master's degree in French and German. See the Graduate School Catalog, as well as the Summer Session Catalog, for special aspects involved when the degree is sought through attendance at summer session.

The Department of Foreign Languages and Classics offers a number of core courses in the Canadian Studies Program, which is an interdisciplinary concentration for undergraduates. These courses examine the literature, culture and civilization of French Canada. The specific listings appear in the French section that follows.

FOREIGN LANGUAGES (FL)

IDL 110. Introduction to the Study of Language—A comprehensive survey of language structure and function, its socio-cultural, psychological and historical aspects. Provides student with basic conceptual and technical tools for understanding the phenomenon of language. No previous training in languages or linguistics required.

11.12. The Western Tradition in Literature—Survey of the major writers in the Western literary tradition. The development of our cultural heritage and the evolution of major literary forms. Semester I: Homer through the Renaissance. Semester II: Neoclassicism to the 20th century. Recommended for English majors. (This course is identical with EH 11.12.) Cr 3.

FL 93. Study Abroad—(Foreign course title here.) The purpose of this course designation is to permit the granting of foreign language credit for courses taken abroad for which there is no exact University of Maine catalog equivalent. May be repeated for credit. Cr 1-6.

100. Field Work in Foreign Languages—Cr 1-12.

Fl 130. Studies in European Literature—Varies in content from generic studies (the novel, the drama) to period studies (the Renaissance, Neo-Classicism). Prerequisite: 6 hours of literature or permission. (This course is identical with EH 130.) Cr 3.

Fl 153. Phonology—The sound systems and morphophonemics manifested by natural languages are studies within the theoretical framework of transformational grammar. Prerequisite: IDL 110 or equivalent. Cr 3.

FL. 166. The Teaching of Foreign Languages—Principles and practice of teaching foreign languages. Analysis of current trends and methods. Application of language learning principles to classroom procedures. Theory and practice of language methodologies at different learning levels. Use of audio-visual devices, including closed-circuit television, and other modern media of instruction and demonstration. For students seeking certification in foreign language teaching. Cr 3.

173. Literary Criticism—Selected readings in literary theory and criticism from Aristotle to the present. Prerequisite: 6 hours of literature or permission. (This course is identical with EH 173.) Cr 3.

FL. 175. Contributions of European Linguistic Groups to the American Cultural Heritage—The cultural contributions of European language groups to the development of America. The roots of many American traditions, tracing origins of characteristic (place) names and words to early immigrants; investigating ways in which groups or individuals dealt with the new environment in accordance with their own heritage. In order to study documentary evidence a reading knowledge of a foreign language is recommended. Cr 3.

FL 190. Topics in Foreign Languages.—The course may be repeated for credit if a different topic is treated. Cr 3.

FL 193. Study Abroad—(Foreign course title here.) The purpose of this course designation is to permit the granting of foreign language credit for courses taken aborad for which there is no exact University of Maine catalog equivalent. May be repeated for credit. Cr 1-6.

FL 221. Seminar in Literary Research Methods—Literary topics transcending national boundaries will be chosen to provide training in the methods and techniques of literary research for students of French, German and Spanish literature. Cr 3.

FL 290. Topics in Foreign Languages—Cr 3.

FOREIGN LANGUAGES AND CLASSICS OFFERINGS IN ENGLISH

The following courses make available in English the literature and civilization of Continental Europe and South America. They are taught by the same faculty who would ordinarily teach them in the national language for majors; in the English format the courses will satisfy humanities requirements for students from Arts and Sciences and will serve as electives for any other students. Prerequisite: 6 hours study of literature.

CL 1.2. Greek and Latin Literature in English Translation—The first semester is devoted to Greek literature; the second semester to Latin literature. No knowledge of either language is necessary. Cr 3.

110. Contemporary French Novel—Existentialism of the New Novel; selected works in English translation of leading contemporary French novelists. (Does not count for the French major.) Cr 3.

115. Twentieth Century French Theatre—Selected works of leading French playwrights of the 20th century in English translation. (Does not count for the French major.) Cr 3.

117. The Age of Enlightenment—Readings in English translation of the political, social, and philosophical writings of Montesquieu, Voltaire, Diderot, Rousseau, and other French writers of the 18th century. May be elected by juniors, seniors, and sophomores with permission. (This course may not be used to meet the requirements of a major or the M.A. degree in French.) Cr 3.

120. Twentieth Century German Literature in English—An introduction to the recent German writings in the drama, novel, and poetry, with special attention to such authors as Kafka, Mann, Brecht, and Grass. (Does not count for the German major.) Cr 3.

125. Modern German Theatre in English—A study of German drama from 19th Century Realism to the present. Reading and discussion of works by Hauptmann, Schnitzler, Kaiser, Brecht, Dürrenmatt, Fisch, Grass, Weiss and others. (Does not count for the German major.) Cr 3.

135. Russian Formalism—The history and doctrine of the Russian formalist movement, its place in 20th century literary criticism; its relationship to and influence on modern Soviet philosophy of art. Cr 3.

140. The Contemporary Spanish American Novel in English—The major works of Julio Cortázar, Carolos Fuentes, Mario Vargas Llosa, Gabriel Garcia Márquez and José Lezama Lima, and other representatives of the contemporary experimental Spanish American novel. (Does not count for the Spanish major.) Cr 3.

145. Cervantes in English—Don Quixote and other major works of Cervantes in English. Lectures on his life and times (Does not count for the Spanish major.) Cr 3.

180. Introduction to Dante's Divine Comedy—Dante's Divine Comedy: Introduction to literary structure, theology, cosmology, and philosophy of the work. Cr 3.

FRENCH (Fr)

1/2. Elementary French—A systematic study of the basics of the French language. Equal emphasis is placed on developing reading, comprehension, speaking and writing skills. For students with no previous study of French or less than two years in high school. Cr 4.

1/2. Elementary French-Audiovisual—For students with no previous study of French or less than two years in high school. Emphasis on achieving skills in the spoken language. Cr 4.

1A-2A. Elementary French (Double Course)—For students with no previous study of French or less than two years in high school. A full year's work will be covered in one semester. Cr 6.

2 R. French Review—A quick review of basic French grammar and pronunciation, in addition to practice in reading, writing and oral comprehension. Designed for those students who have had elementary French in high school or college but who feel that they need some review before going on to higher-level French courses; also intended to prepare students for foreign travel. Two hours per week. Cr 1.

3/4. Intermediate French—An integrated approach. Reading texts of a literary and/or cultural nature, as well as audio-visual materials, will be employed to strengthen reading,

writing and especially speaking and comprehension skills. Also includes a systematic but gradual review of the essentials of French grammar. Cr 4.

3A-4A. Intermediate French (Double Course)—For students who have completed Fr. 2 or Fr. 1A-2A or the equivalent in high school. A full year's work will be covered in one semester. Cr 6.

5.6. French Conversation and Composition—Systematic training in the correct usage of spoken and written French through a broad range of conversational situations and writing topics. Cr 3.

7. French Diction—The pronunciation of French, with some attention also to the rudiments of structure of the language. Primarily a service course for the Departments of Performing Arts and Speech, e.g., vocalists, actors, radio and television announcers. No prerequisite. Cr 1.

8. French Play Production-Participation in the acting and production of plays in the foreign language. Prerequisite: permission of the instructor. This course may be repeated for credit another year. Cr 3.

9.10. Readings in French Literature—For students who wish practice in reading in French. This course also prepares students for literature and civilization courses at the 100 level. Discussion in French. Prerequisite: Fr 4 or the equivalent. Cr 3.

15. Advanced French Conversation—Oral practice for the advanced language student. Coursework revolves around the discussion of cultural and intellectual issues, as well as current political and social events, with a view toward increasing idiomatic and abstract vocabulary. Prerequisite: Fr 5 or permission of the instructor. Cr 3.

54. Quebec in Transition—An examination of Quebec's recent past, covering the crucial period of the Quiet Revolution. Relevant issues are viewed within the context of the history, culture and politics of Quebec, beginning with the Duplessis era. Prerequisite: Fr 56, CAN I or permission. Cr 3.

56. French Canadian Civilization—An introductory course on French Canada which will examine the literature, history and folk art of French Canada, and will attempt to explain the orientation of modern day Quebec. Cr 3.

97. French May-Term — Total Immersion Program. Prerequisite: Fr 4 or permission of instructor. Cr 3.

100. Advanced French Grammar and Composition — Designed to enhance competence in the areas of French grammar, syntax and written expression. An exposition of grammatical and syntactical principles through composition practice. Prerequisite: Fr 5 or 6 or permission of instructor. Cr 3.

101. Thème et Version—Translation from French into English and from English into French of texts exemplifying various modes of written expression. Prerequisite: Fr 100 or permission of instructor. Cr 3.

Fr 9 or 10 (or permission) are prerequisites for the study of literature and civilization at the 100 level.

104. Medieval and Renaissance French Literature—Origin, formation and development of a national literature as seen through the prose, poetry and theater from the beginnings through the 16th century. Cr 3.

105. Seventeenth Century French Literature—Literary trends in French classicism: Descartes, Pascal, Corneille, Racine, Molière, La Fontaine. Cr 3.

106. Eighteenth Century French Literature—Readings from the works of Montesquieu, Voltaire, Rosseau, Diderot, etc., with special attention to Enlightment Thought and to the novel genre. Cr 3.

107. Nineteenth Century French Literature—Readings of major 19th century figures, including Chateaubriand, Hugo, Flaubert and Zola, with particular attention to social and philosophical themes as well as concepts of language. Cr 3.

108. Twentieth Century French Literature—Readings in the novel, in poetry or in theater (content varies). May be taken over for credit, with permission of instructor. Cr 3.

109. French Critical Methodology—Examination of cases of European critical methods from 19th century to present. Special attention to concepts of history and structural method. Cr 3.

120. French Phonetics—A formal study of the French sound system with considerable practice in phonetic transcription. Practical and remedial work in pronunciation. Prerequisite: Fr 4 or the equivalent. Cr 3.

140. Franco-American Civilization—An interdisciplinary study of the French heritage in North America. Cr 3.

142. French Language of North America—An historical approach to the study of the Franco-Québécois and the Franco-American languages. Emphases on the morphology, syntax, vocabulary and phonetic system in order to understand the present status of the languages. Research in the areas of the spoken and written language. Competencies in the reading and oral comprehension of French are recommended. Cr 3.

152. The Novel of Québec—An examination of the evolution of the novel in Québec from 1915 to the present: roman de la terre, the urban novel, the new novel. Authors studied will include Hémon, Grignon, Guèvremont, Ringuet, Roy, Hébert and Aquin. Prerequisite: Fr 4 or equivalent. Cr 3.

156. Seminar in Québec Studies—An advanced course which will examine some of the more complex issues which Québec has had to confront. Student will be expected to research in selected areas, and to report their findings regularly to the rest of the class. Prerequisite: Fr 56 or permission. Cr 3.

157. French Civilization—Readings, discussions, lectures, oral and written reports on varied aspects of France, its people, institutions, and culture to provide the background essential to an understanding of French literature, thought, and artistic expression. Prerequisite: Fr 4 or the equivalent. Cr 3.

160. Black African Literature in French—Lectures, readings and discussion of representative novelists, dramatists and poets of Black French Africa from 1930 to the present. Prerequisite: A reading knowledge of French and permission of the instructor. Cr 3.

190. Topics in French—Projected course topics in French and French-Canadian literature include: contemporary cinema, surrealism, contemporary French thought, modern French critical theory, semiotics, symbolism, literature of commitment, images of women, women writers. The content of this course will change every semester for credit if a different topic is treated. Cr 3.

197. Independent Projects (undergraduate).

199. Applied French Linguistics—The French sound system, spoken grammar, basic concepts of descriptive and general linguistics. Cr 3.

Graduate Courses (Fr)

200. History in the French Language—Cr. 3

204. Seminar in Medieval and Renaissance Literature—Cr. 3

205. Seminar in French Classicism—Cr. 3

206. Seminar in Literature of the Eighteenth Century—Cr. 3

207. Seminar in Literature of the Nineteenth Century—Cr. 3

208. Seminar in the Novel—Cr. 3

209. Seminar in Poetry—Cr. 3

210. Seminar in Theatre—Cr. 3

212. Contemporary French Political and Social Institutions—Cr. 3

213. English-French Translation—Cr. 3

220. French Linguistics—Cr. 3

250. Seminar in French-Canadian Literature and Language—Cr. 3

252. Films, Video Drama and Literature in French Canada—Cr. 3

291.292. Individual Authors—Cr. 3

293.294. Projects in French—Cr. 3

399. Graduate Thesis—Cr. 3

GERMAN (Gm)

1-2. Elementary German—A systematic study of the basics of the German language. Equal emphasis is placed on developing reading, comprehension, speaking and writing skills. For students with no previous study of German or less than two years in high school. Cr 4.

1A/2A. Elementary German-(Double Course)—A systematic study of the basics of the German language. For students with no previous study of German or less than two years in high school. A full year's work will be covered in one semester. Cr 6.

3/4. Intermediate German—An integrated approach. Reading texts as well as various audiovisual materials will be employed to strengthen reading, writing and especially speaking and comprehension skills. The course also includes a systematic, but gradual review of the essentials of German grammar. Cr 4.

3A-4A. Intermediate German-(Double Course)—For students who have completed Gm 2 or Gm 1A-2A or the equivalent in high school as determined by a placement test. A full year's work will be covered in one semester. Cr 6.

5.6 Practical German—A third year conversational language course designed to further develop students' comprehension, speaking and writing skills for everyday use. All classes are conducted in German. Prerequisite: Gm 4 or equivalent. Cr 3.

7. Readings in Scientific German—For students who have completed Gm 3 or equivalent and wish to be able to read scientific articles in German. The second half of the semester will be devoted to individualized readings in the student's special field of interest. Prerequisite: Gm 3 or equivalent. Can be taken as an alternate to Gm 4; also serves as preparation for meeting graduate school language requirements. Cr 3.

8. German Play Production—Participation in the acting and production of plays in the German language. This course may be repeated for credit another year. Prerequisite: Permission of the instructor. Cr 3.

9. German Diction—The pronunciation of German, with some attention also the rudiments of structure of the language. Primarily a service course for the theatre and Departments of Music and Speech, e.g., vocalists, actors, and television announcers. No prerequisites. Cr 1.

11.12. Introduction to German Literature—An introduction to the important periods of German literature from medieval times to the 20th century, with representative readings. Prerequisite: Gm 4 or equivalent. Cr 3.

97. German May-Term — Total Immersion Program. Prerequisite: Gm 4 or permission of instructor. Cr 3.

100. Advanced German Grammar—Designed to provide a summary in German grammar and syntax, especially for prospective teachers. Cr 3.

102. German Civilization—Readings, discussions, lectures, oral and written reports on Germany, its people, institutions, and culture to provide the background essential to an understanding of German literature, thought, and artistic expression. Prerequisite: Gm 4 or the equivalent. Cr 3.

103. History of the German Language—A systematic study of the development of the German language from Indoeuropean times to the present. The goal of this course is to put present day German in its linguistic perspective, to make the speaker of modern German more aware of the reasons and origins of specific forms, patterns and usages and to furnish the prospective teacher with a linguistic background in German. Prerequisite: Gm 4 or the equivalent. Cr 3.

105. Enlightenment and "Storm and Stress"—Masterpieces of prose, drama, poetry, and essays in critical thought from the 18th century. Special emphasis will be given to Lessing, young Goethe, and Schiller. Prerequisite: Gm 4. Cr 3.

106. Goethe—Readings from selected works of prose, poetry and drama from Goethe's classical period, with lectures on historical background and influence on later German literature.

107. Schiller—Selected works of poetry, drama, and critical writings from Schiller's classical period, with lectures on historical background and influence on later German literature. Prerequisite: Gm 4. Cr 3.

108. The Romantic School—Readings from works of major authors of the Romantic School, including Novallis, Schlegel, Tieck, Wackenroder, Brentano, E.T.A. Hoffmann, and Eichendorff. Prerequisite: GM 4. Cr 3.

110. German Literature from 1832 to the Turn of the Century—Readings from representative works of the 19th century realists, with special emphasis on the Novelle. Prerequisite: Gm 4. Cr 3.

111.112. German Literature of the 20th Century—Readings and discussions of representative authors of the 20th century. Emphasis in the first semester will be on literature before 1945. The second semester will focus on the development of new techniques in the novel, Novelle, and drama in the Germanys, Austria, and Switzerland of the post-war era. Prerequisite: Gm 4. Cr 3.

190. Topics in German—Specific topics to be announced. It will vary from semester to semester depending on special interest of faculty member teaching it. The course may be repeated for credit if a different topic is treated. Cr 3.

197.198. Projects in German. Cr 3.

GREEK (Gk)

1-2. Elementary Greek—Fundamentals of the Greek language, in the second semester, selections from Euripides' Alcestis. For students who have had little or no preparation in Greek. Cr 3.

3/4. Readings in Greek Literature—In the first semester, Plato's Apology, Euripides' Alcestis, and Sophocles' Oedipus Rex. In the second semester, selected books from Homer's Iliad. Cr 3.

ITALIAN (It)

It. 15. Italian Diction—The pronunciation of Italian, with some attention to the rudiments of structure of the language. Designed primarily for singers but may also be elected by others. No prerequisite. Cr 1.

LATIN (Lt)

1-2. Elementary Latin—Fundamentals of the Latin language. Cr 3.

3.4. Readings in Latin Literature—Selections from Ovid's poetry. Emphasis on literary values. Second semester, selections from Martial's epigrams, selected letters of Pliny and Tacitus, Agricola. Cr 3.

47.48. Latin Prose Composition and Stylistics—Review of grammar and syntax, with particular attention to Cicero and Tacitus. The writing of prose, especially in the style of Cicero. This course, which is required for majors, should be taken in the junior year or earlier, if possible. Cr 3.

In Latin (Lt)

151. Roman Comedy: Plautus and Terence—One play of each dramatist will be read. The source of Roman comedy, its literary features, and influence upon later literature. Given every three years; offered in 1980. Cr 3.

152. Roman Philosophical Thought—Selections from Lucretius, *De Rerum Natura*, and Cicero's philosophical essays. The three major philosophical schools: Academic, Stoic, Epicurean, and their influence on Roman thought. Given every three years; offered in 1981. Cr 3.

153. Poetry of the Republic and Early Empire—The lyric poetry of Catullus, the *Odes* of Horace. The origin and development of satire, with selections from the satires of Horace and Juvenal. Given every three years; offered in 1982. Cr 3.

154. Prose of the Republic of Early Empire—Selections from Cicero's letters, Pliny's letters, and Tacitus' *Annals*. Given every three years; offered in 1980. Cr 3.

181. Virgil: The Ecologues, Georgics, Aeneid—The poet's background achievement, and influence upon later literature. Given every three years; offered in 1981. Cr 3.

182. Survey of Latin Literature—A rapid survey of the Archaic Age to Medieval Latin. Lectures, discussions, reports, and assigned readings. Given every three years; next offered in 1982. Cr 3.

197.198. Projects in Latin—Individual work on a project of the student's selection. Prerequisite: consent of the department head. Cr Ar (maximum: 3 hrs.).

RUSSIAN (Ru)

1-2. Elementary Russian—A systematic study of the basics of the Russian language. Equal emphasis is placed on developing reading, comprehension, speaking and writing skills. For students with no previous study of Russian or less than two years in high school. Cr 4.

3/4. Intermediate Russian—An integrated approach. Reading texts as well as various audiovisual materials will be employed to strengthen reading, writing and especially speaking and comprehension skills. The course also includes a systematic, but gradual review of the essentials of Russian grammar. Cr 4.

5.6 Practical Russian—Systematic training in correct pronunciation, intonation and usage, and in vocabulary building, with written and oral practice. Prerequisite: Ru 4 (or the equivalent) and permission of the instructor. This course is conducted entirely in Russian. Cr 3. (Next offered '79-'80)

109/110. Introduction to Russian Literature—A survey of major periods in Russian and Soviet literatures; readings of representative works, major works and general discussions in English, short representative works in Russian. Course satisfies the humanities requirement. Prerequisite: Russian 4 or permission of instructor. Cr 3. (Offered upon sufficient demand.)

153/154. 20th Century Russian Prose and Poetry—Lectures, readings and discussions of representative writers of the 20th century from the symbolists to the present, including examples of the Soviet underground press (Samizdat). Ru 153, prose; Ru 154, poetry. Prerequisite: permission. Cr 3 each. (offered upon sufficient demand.)

167/168. Advanced Russian Grammar, Composition and Stylistics—Provides an adequate foundation in Russian grammar, composition and stylistics for majors and prospective teachers. An intensive analysis and review of advanced grammar and syntax (167); a systematic study of the problem of style as seen through composition and translation (168). Prerequisite: Ru 8 or permission. Cr 3.

SPANISH (Sp)

1/2. Elementary Spanish—A systematic study of the basics of the Spanish language. Equal emphasis is place on developing reading, comprehension, speaking and writing skills. For students with no previous study of Spanish or less than two years in high school. Cr 4.

1A-2A. Elementary Spanish (Double Course)—For students with no previous study of Spanish or less than two years in high school. A full year's work will be covered in one semester. Cr 6.

3/4. Intermediate Spanish—An integrated approach. Reading texts as well as other materials will be employed to strengthen reading, writing and especially speaking and comprehension skills. The course also includes a systematic, but gradual review of the essentials of Spanish grammar. Cr 4.

3A-4A. Intermediate Spanish (Double Course)—For students who have completed Sp 2 or Sp 1A;2A or the equivalent in high school as determined by a placement test. A full year's work will be covered in one semester. Cr 6.

5.6. Spanish Conversation and Composition—A systematic attempt to increase the student's fluency in spoken Spanish and to improve his command of writing through selected vocabulary and grammar exercises, discussions, skits, speeches, and compositions. Classes are conducted in Spanish. Need not be taken in sequence. Prerequisite: Sp 4 or equivalent. Cr 3.

7. Spanish Readings—Selections are oriented to current events and contemporary literary texts. For students in all disciplines, as well as for students who wish further practice in reading before beginning 100 level Spanish course. Prerequisite: Sp 4 or equivalent. Cr 3.

8. Introduction to Spanish Literature—A retrospective survey of the important works in Spanish literature beginning with the 20th century and proceeding to medieval times. A brief introduction to genres, trends, and literary techniques to prepare the students for upper level literature courses. Prerequisite: Sp 4 or equivalent. Cr 3.

18. Spanish Play Production—Participation in the acting and production of plays in Spanish. Course may be repeated for credit another year with permission of the instructor. Cr 3.

100. Advanced Spanish Grammar, Composition, and Stylistics—Designed to provide an adequate foundation in Spanish grammar, syntax, and composition for prospective teachers.

Also applied stylistics for those with certain proficiency of expression interested in creative writing. Prerequisite: Sp 5 or 6 or permission of instructor. Cr 3.

For all 100 level literature courses, there is a prerequisite of Sp 7 or 8, or permission of the instructor.

101. Golden Age—Masterpieces of poetry and prose from the 16th and 17th centuries. The aim is to give an overview of the period and to refine the student's critical abilities. Poetry by Garcilaso, Fray Luis, San Juan, Góngora, and Quevedo. Prose readings include *Lazarillo de Tormes, Diana, Sueños y discursos,* and *Novelas ejemplares*. Cr 3.

102. Comedia—Theater of the 16th and 17th centuries. Authors include Lope de Vega, Tirso de Molina, and Calderón de la Barca. Cr 3.

103. Cervantes—A careful reading of the Spanish masterpiece, *Don Quixote*, with class discussions and lectures on its historical background and continuing influence. Cr 3.

105. Spanish Literature of the nineteenth Century—The Romantic Movements: between tradition and revolt. The novel from "costumbrismo" to "realismo". Spanish naturalism: a compromise. Cr 3.

106. Spanish Literature of the twentieth Century—Selections from the poetry, essays, and novels of the pre and Civil War period focused through readings in the history and thought of the times. Cr 3.

107. Contemporary Novel—Experimental Novel of the Twentieth Century. Cr 3.

108. Latin-American Masterpieces—A selection of key essays, poems, short stories, and novels from the colonial period to the 20th century. Cr 3.

109. Contemporary Latin-American Short Story—A study of some of the major short story writers from Latin America. Background lectures, reading and analysis, class discussion. Included in this course will be a study of such significant contemporary concerns as: poverty, politics, religion; and such themes as the interplay of fantasy and reality and the relativity of madness. Cr 3.

110. Latin American Novel—The contemporary novel in Spanish America, with special attention on the novelists of the BOOM: among them Cortázar, Garcia Márquez, Vargas Llosa and Fuentes. Cr 3.

111. Contemporary Hispanic Theater—A study of some of the major playwrights from Spain and Latin America of the 20th century. Reading and analysis of plays; class discussion. Cr 3.

157. Spanish Civilization—Readings, discussions, lectures and written reports on Spain, its people, institutions and culture for the purpose of providing the background essential to an understanding of Spanish literature, thought and artistic expression. Cr 3.

158. Spanish American Civilization—Readings, discussions, lectures and written reports on Latin America, its people, institutions, and culture for the purpose of providing the background essential to an understanding of Latin America literature, thought and artistic expression. Cr 3.

190. Topics and Individual Authors in Spanish—Content of course will change from semester to semester. The course may be repeated for credit if a different topic is treated. Cr 3.

197.198. Projects in Spanish—Independent study on topics selected by student and instructor. Cr 3.

GEOLOGICAL SCIENCES

Professors Norton (Chairman), Borns, Denton, Hall, Osberg, Schnitker; Associate Professors Chernosky, Fink, Howd, Hughes, Mayer: Assistant Professor Kellogg, T.: Faculty Associates Anderson, Kellogg, D., Stanley, Stuckenrath

The geological sciences are concerned with the physical and chemical characteristics of minerals and rocks, with their occurrence, arrangement, and surface expression, and with the history of the earth and its organic inhabitants. The curriculum provides for a basic understanding of the geological sciences and is sufficiently flexible to allow students with in-

terests in geochemistry, geophysics, paleontology, and oceanography to pursue additional courses in appropriate ancillary sciences.

A geology major is prepared to enter directly into industry or survey work, or to enter graduate school in geology. In addition, if Zo 4, Ch 151/152, and Ch 161/162 are taken the requirements for medical or dental schools are met.

The requirements for the major include: Gy 1, or 5, or 6; Gy 2; Gy 111; Gy 112; Gy 114; Gy 115; Gy 116; Gy 155; Gy 158; 6 hours of elective geology courses; Ms 19; Ms 26; Ch 13/14; Ps 1/2 or 1a/2a; and Bio 1. For students contemplating graduate work in geology, Cs 81, mathematics through Ms 28, and attainment of proficiency in French, German, or Russian are recommended.

An approved summer field course is recommended between the junior and senior years. This course may be counted toward the major requirements.

The specimen curriculum is somewhat flexible and may be altered for individuals with previous geological training. Special interdisciplinary programs may be arranged after consultation with the departmental undergraduate adviser.

GEOLOGY SPECIMEN CURRICULUM

Freshman Year

		Credit			Credit
Gy 1	Aspects of the Natural Environment	4	Gy 2	Aspects of the Natural Environment	4
Ch 13	Chemical Principles	4	Ch 14	Chemical Principles	4
Eh 1	College Composition (if necessary) or Elective	3	Ms 19	Prin. of Statistical Inference	3
	Elective (or Ms 26)	4		Elective	4
		15			15

Sophomore Year

Gy 111	Mineralogy	4	Gy 112	Intro. to Petrol.	4
Ps 1 or 1a	General Physics	4	Ps 2 or 2a	General Physics	4
Ms 26	Analytical Geometry and Calculus	4	Bio 1	Basic Biology	3
	Elective	3		Elective	4
		15			15

Junior Year

Gy 115	Prin. of Stratigraphy	3	Gy 114	Invertebrate Paleotology	3
Gy 155	Optical Mineralogy	4	Gy 158	Petrography	4
	Elective	4		Elective	4
	Elective	4		Elective	4
		15			15

Senior Year

Gy 116	Intro. to Structural Geology	4	Gy	Elective	4
Gy	Elective	4		Elective	4
	Elective	4		Elective	4
	Elective	3		Elective	3
		15			15

GEOLOGY (Gy)

1/2. Aspects of the Natural Environment—Fall semester: Earth materials and processes, including the structure of matter, formation of igneous rocks, radioactive age-dating, chemical and mechanical destruction of rocks, formation of sedimentary rocks, evolution of mountain belts, and formation of metamorphic rocks. Laboratory work includes a consideration of earth materials in preparation for three compulsory one-day weekend field trips. Lec 3, Rec, Lab and field trips, Cr 4.

Spring semester: The structure and composition of the interior of the earth, mountain building processes; the origin and use of paleomagnetic data in the continental drift question;

the origin and evolution of the atmosphere, the hydrosphere, and life; mechanisms and patterns of biological evolution. Man's place in and utilization of his environment. Laboratory work includes preparation for two compulsory field trips in May. Prerequisite: Gy 1. Lec 3, Rec, Lab and field trip. Cr 4.

5. Geology for Foresters—A study of general physical geology to provide an understanding of the physical properties and behavior of surficial and crustal materials. Lec 2, Lab 2, Cr 3.

6. Geology for Engineers—A study of general physical geology to provide a basis for civil engineering applications. Emphasis is on topics related to the understanding of physical properties and behavior of surficial and crustal materials. Lec 3, Lab 2, Cr 4.

21.22. Geologic Problems—The study of and report upon some original investigation. Time to be arranged. Prerequisite: consent of instructor. May not be used as a required geology elective. Cr 1 or 2. May be taken more than once.

56. Non Honors Senior Thesis—Cr. 3.

Courses Primarily for Undergraduate Students but Open to Graduate Students

111. Mineralogy—Introduction to crystallography and the crystal chemistry of minerals. Identification of the common minerals by their physical properties. Prerequisites: Ch 13/14. Lec 3, Lab 4, Cr 4.

112. Introduction to Petrology—Introduction to modes of occurrence, textures, and classification of rocks. Simple chemical concepts of rock systems. Prerequisite: Gy 1/2, Gy 111. Lec 3, Lab 3, Cr 4.

114. Invertebrate Paleontology—Description and classification of the important phyla of fossil invertebrates and a survey of their use in biostratigraphic, evolutionary, paleoecologic, and other studies. One or more day or weekend field trips. Prerequisite: Gy 2, Bio 1. Lec 2, Lab 4, Cr 3.

115. Principles of Stratigraphy—Basic concepts and techniques of stratigraphy and sedimentation. Several day and weekend field trips. Prerequisite: Gy 2, 5, or 6, Ms 19, or permission. Lec 2, Lab 3, Cr 3.

116. Introduction to Structural Geology—Principles of structural geology, with emphasis on the integration of field observations and theory. Three weekend field trips. Prerequisites: Gy 112, Ps 1/2 or 1a/2a, Ms 26. Lec 2, Lab 3, Cr 4.

124. Geology of North America—The tectonic development of selected regions of North America which illustrate the theories and principles of continental evolution. Prerequisite: Gy 1, 5, or 6; Gy 2. Lec 3, Cr 3.

125. Ore Deposits-Origin and Exploration—The chemical and physical factors controlling the formation of metallic mineral deposits. Information derived from experimental work is considered and related to documented field observations. Techniques employed in ore deposit exploration explained as they apply to specific geologic situations. Prerequisites: Gy 112, Gy 116 or permission. Lec 4, Cr 4.

155. Optical Mineralogy—Elementary theory of the polarizing microscope and the optical properties of crystalline substances. Use of the polarizing microscope in the determination of non-opaque minerals. Prerequisite: Gy 111, Ps 1/2 or 1a/2a. Lec 2, Lab 6, Cr 4.

158. Petrography—Application of elementary optical theory in the determination of non-opaque minerals in thin section. Theory and use of the universal stage and point counter. Textures and mineral relationships in igneous, metamorphic, and sedimentary rocks. Prerequisite: Gy 112, 155, Ms 19. Lec 1, Lab 4, Cr 4.

Courses Primarily for Graduate Students but Open to Undergraduate Students

IDL 200. (Gy, Ay, Bt) Seminar in Quaternary Studies—Lec 2, Cr 2.

210. Special Topic: _____—Cr 1 or 2. Course may be repeated with different subtitles.

221. Low Temperature-Pressure Geochemistry—Lec 3, Cr 3.

222. Chemical Sedimentology—Lec 2, Cr 2.

224. Aqueous Terrestrial Geochemistry—Lec 2, Cr 2.

230. Tectonophysics—Lec 3, Cr 3.

232. Sedimentology—Lec 2, Lab 3, Cr 3.

IDL 239. Ice Ages and Mankind—Lec 3, Cr 3.

241. Glacial Geology—Lec 2, Lab 2, Cr 3.

242. Quaternary Environments and Climatic Change—Lec 3, Lab 2, Cr 3.

243. Quaternary History of Northeastern North America—Lec 2, Cr 3.

244. Glaciology—Lec 2, Lab 2, Cr 3.

IDL 245. (Bt, Gy) Late Quaternary Paleoecology—Lec 2, Lab and Rec 5, Cr 4.

IDL 260. (Oc, Gy) Marine Geology—Lec 3, Cr 3.

IDL 264. (Oc, Gy) Structure and Tectonics of the Seafloor—Lec 3, Cr 3.

IDL 266. (Oc, Gy) Micropaleontology—Lec 3, Lab 2, Cr 4.

IDL 267. (Oc, Gy) Actuopaleontology—Cr 2.

IDL 268. (Oc, Gy) Deep Sea Stratigraphy and Paleooceanography—Lec 3, Cr 3.

IDL 275. (Gy, Oc). Late Quaternary Marine Paleoclimatology and Paleooceanography—Lec 2, Rec 1, Cr 3.

274. Physical Geochemistry—Lec 3, Cr 3.

277. Experimental Petrology—Lec 3, Cr 3.

278. Phase Relationships in Petrologic Systems—Lec 4, Cr 4.

Courses for Graduate Students Only

301.302. Directed Study in Geology—Course may be repeated with different subtitles.

399. Graduate Thesis

HISTORY

Professors Doty, Hakola, Jeffrey, A.M. Johnson, Nolde*, J. H. Pease**, W. H. Pease**, Smith (Chairman); Associate Professors Babcock, Baker, Battick, Blanke, Fries, Nadelhaft, Schonberger, Schriver; Assistant Professors Bregman, TeBrake, Greer; Lecturer Tallman; Graduate Assistants

Each history major must complete 12 hours from among Hy 1.2, Hy 3.4, Hy 5.6, Hy 7.8. Students who have not had adequate preparation in United States and/or European/World History in high school must pass the CLEP examination or take Hy 3.4 and/or Hy 5.6 respectively.

History majors also need at least 24 hours of 100-and/or 200-level history courses approved by their adviser. No introductory courses can count toward these 24 hours.

Dean's List majors are eligible to take at least one 200-level history course in each semester of their senior year. Other majors may be admitted to these 200-level courses by special permission.

The department offers an emphasis in the international affairs program. See International Affairs in Index.

The department offers the M.A. degree in history, with specialities in most areas of history. The Ph.D. degree is offered in United States history, Canadian-American history; and in the history of Great Britain and the Commonwealth. Within these fields, special emphasis may be placed on military and maritime history. Further details may be found in the Graduate School Catalog.

*on leave Fall 1980
**on leave Spring 1981

HISTORY (Hy)

1. Classical Civilization—A basic introduction to the history, culture, art, and thought of the ancient Greeks and Romans, emphasizing those aspects of the classical world which have had an impact on our civilization. Audiovisual aids used extensively. Cr 3.

2. Medieval Civilization—Investigation of the cultural development of Europe during the Middle Ages, from late Roman times through the 15th century, developing a broad overview of the distinctively European civilization that emerged during the period. Cr 3.

3.4. United States History—The historical experience of the American people through the major ideas and forces that have shaped the Republic. First semester: the exploration of

America through post-Civil War Reconstruction; Second semester: the urban-industrial age, liberal political reform, and American world leadership. (Both 3 and 4 given each semester) Cr 3.

5.6. History of European Civilization—Europe and its civilization from its medieval background to the present. The emphasis is upon those political, economic, social, and intellectual developments which help to explain our present-day civilization. (Both 5 and 6 given each semester) Cr 3.

7.8. Asian Civilization—The origins and evolution of Asian societies from prehistoric times to the present. Emphasis on China, Japan, India, and Southeast Asia. First semester: the cultural, philosophical, and political foundations of Asian societies to the 17th century. Second semester: Asia's encounters with the Western world and the most significant changes in Asia in the 19th and 20th centuries. Cr 3.

10. History of Maine—A survey of Maine's social, economic, and political life, from primitive times to the present. After a brief study of Indian life preceding white settlement, the periods of colonial, provincial, and state history are covered. (Given both semesters every year) Cr 3.

15.16. The World in the Twentieth Century—The response of world leaders and ordinary people to the events of the 20th Century: Two World Wars and a Cold War, competitive ideologies of fascism, communism and democracy, the rise of Asian, African and Mideast powers, the impact of the Great Depression and technology, and popular culture and morality from the age of the flapper to today. Lectures, films, and discussions. (Introduced in 1977-78). Cr 3.

50. History as People. The American Experience as Biography—An exploration of the American experience from the colonial period to the present. Major facets of American life explored through lectures on the lives and important actions of representative Americans. The premise of this course is that the past is sometimes best understood through its individual people. Cr 3.

99. Problems in History—An analysis of a selected controversial or contemporary historical problem. In some cases the topic to be studied and the method of approaching it may be chosen jointly by interested students and an instructor. No prerequisites. Cr 3.

101. History of Greece—Ancient Greece from the "Heroic Age" to Alexander the Great. Discovery of rational thought, the development, crisis, and failure of democracy in classical Athens; unification of city-states and creation of a world empire that launched a new era in world history. Cr 3.

102. Roman History—The rise of ancient Rome from a small Italian town to mistress of the Mediterranean. Problems of excessive greatness: failure of a city-state republic to rule a vast empire; triumph of Caesarism. The establishment of the "Roman Peace" under the emperors; problem of the "Decline and Fall of the Roman Empire." Cr 3.

103. Early Middle Ages—Europe from late antiquity to about 950, considering the social, economic, political, and intellectual developments during Merovingian and Carolingian times, emphasizing the early medieval agricultural revolution and reconstructing the factors affecting the lives of ordinary people. Prerequisite: Hy 5 or permission. Cr 3.

104. Late Middle Ages—Social, economic, political, and intellectual history of Europe from 950 to the Renaissance, focusing on the medieval frontier period and the late medieval era of environmental crisis and economic contraction. Prerequisite: Hy 5 or permission. Cr 3.

105. The Renaissance and Reformation—The social, intellectual, cultural and economic achievements of the period 1300-1600. The Protestant and Catholic reforms and their effects will be evaluated. (Fall). Prerequisite: Hy 5.6 or permission. Cr 3.

106. The Age of Kings, 1600-1789—Histories of specific states will be subordinated to analyses of major trends in the period: state-building, economic changes, absolutisms, science, war and diplomacy. (Spring) Prerequisite: Hy 5.6 or permission. Cr 3.

107. The Age of Revolution, 1789-1860—The effects of the Industrial and French Revolutions on European politics, society, and thought; the transformation of a peasant, agrarian world to a middle-class, urban society; from oligarchial to liberal politics, from aristocratic to middle-class tastes, from enlightened thought and the romantic reaction to Marxian and Darwinian intellectual bombshells. (Fall) Prerequisite: Hy 5.6 or permission. Cr 3.

108. The Age of Liberalism, 1860-1919—Europe from the liberalism of Bismarck, Cavour, Napoleon III, Disraeli, and Gladstone to the rise of mass democracy and the welfare state under the impact of a Second Industrial Revolution; the rise of socialism, emergence of modern thought, World War I, and the Russian Revolution. (Spring) Prerequisite: Hy 6 or permission. Cr 3.

109. Twentieth Century Europe, 1919 to Present—Europe and her peoples since 1919, challenged by fascism, communism, economic crises, the loss of empire, intellectual uncertainty, world war, and Cold War division into East and West, together with post-1945 attempts to regain a position of world influence through economic and political integration, modernization, and renewed cultural vitality. (Fall). Prerequisite: Hy 5.6 or permission. Cr 3.

113. Expansion of Europe—The origins, course, and effects of overseas expansion from 1400 to 1800. Lectures, readings and research papers on: motives and means for expansion; colonial empires; effects upon European and non-European States. (Not offered 1978-79) Prerequisite: Hy 5.6 Cr 3.

117. Environmental History of Europe—Changes in the basic interrelationships between nature and human culture, emphasizing the gradual evolution of European society within its physical setting from small, isolated groups of primitive agriculturalists in prehistoric times, through the complex peasant society of the Middle Ages, to the emergence of a highly urbanized, industrialized society today. (Fall) Cr 3.

119.120. History of Science—Development of the sciences from earliest times to the Twentieth Century, emphasizing the social factors, such as politics and economics, influencing science. First Semester: from antiquity to the European Scientific Revolution. Second Semester: American science and its relationship to Western science since 1700. No Freshmen. Cr 3.

121. Early Modern France—The political, social, and intellectual history of France from 1500-1815. The France of Francis I, the religious wars, the rise of bureaucratic absolution, the ages of Louis XIV and Louis XV, the conquest and loss of Canada, the development of classicism, and the enlightenment in France, and the era of the French Revolution and Napoleon. Cr 3.

122. Modern France—French history since Napoleon. The internal political and social challenges from the Left and Right in the failure of three monarchies and three republics, the rise and decline of the French empire, economic growth and lag, Gaullism and the Fifth Republic, and French cultural leadership from Romanticism to Existentialism. (Fall). Cr 3.

123.124. History of Russia—Russian history from the earliest times to the present. First semester: the political, social, economic, and intellectual development of Tsarist Russia to the end of the Crimean War. Second semester: late 19th century Russia, the decay of the Tsardom, the Bolshevik Revolution, and the subsequent internal development and expansion of the Soviet Union. Prerequisite: Hy 5.6 or permission. To alternate with Hy 125.126. Cr 3.

125.126. History of Modern Germany—First semester: the decline of the Holy Roman Empire, the rise of Prussia, the Napoleonic impact, and the period to 1848. Second semester: the unification of Germany, the Weimar and National Socialist periods, and the Federal republic. Political, social, economic, and intellectual developments emphasized. Prerequisite: Hy 6 or permission. To alternate with Hy 123.124. Cr 3.

127.128. European Intellectual History—Interaction of ideas with society and politics in succeeding historical periods from late antiquity to the present, emphasizing changing views toward man, society, science, literature, arts, religion and government. Second Semester: from late antiquity to 1700. First Semester: 1700-present. Prerequisites: Hy 127-Hy 1 or Hy 3 or Hy 5; Hy 128-Hy 6. Cr 3.

130. Industry and European Society—How European plain people and businessmen began an Industrial Revolution in the 18th century and continued it to the present. How changing industrialization modified people's lives and living standards, their perception of work and property, moral and religious values, family life and leisure, the status of women and children, violence and law and order, the nature and organization of capitalism, and protest movements. Cr 3.

131. Understanding European History Through Fiction—The discussion of British and European works of fiction as sources for understanding European political and social history from the French Revolution to the present. Cr 3.

133.134. European Diplomatic History—The diplomatic history of modern Europe, emphasizing the foreign policies of the major European powers and the changing concepts of international relations. The relationship of nationalism and military strength to foreign policy formulation. Prerequisite: Hy 6 or permission. Cr 3.

135.136. History of China—First semester: the history and culture of the Chinese people from earliest times to the 19th century. Second semester: the Western penetration of China, coming of the missionaries and the gunboats, impact of Western ideas, and the resulting nationalist and revolutionary movements. Prerequisite: Hy 7.8 or six hours of history, or permission. Cr 3.

137. History of Modern Japan—The history of Japan during the past century. Western penetration, the influence of Western ideas on traditional Japanese culture, the emergence of the modern Japanese industrial state, and the rise and defeat of the Japanese empire. Prerequisite: Hy 7.8 or six hours of history or permission. Cr 3.

141. History of Modern China—Twentieth century China and its 19th century antecedents. The social, economic, and political disintegration of the imperial regime, the subsequent revolutionary period, and the era of the People's Republic. Prerequisite: Hy 7.8 or Hy 135.136. Cr 3.

147.148. Hispanic America—The Spanish and Portuguese colonial empires in America. The national period of Hispanic America, and contemporary problems and tensions of the area. Prerequisite: Hy 3.4 or Hy 6 or permission. Cr 3.

149. Argentina, Brazil, and Chile—A history of the major countries of South America from their independence in 1823 to the present. Their social structures, political developments, and international relations. Prerequisite: Hy 148 or permission. Cr 3.

150. Mexico—Mexico from early times to the present. The social and political structure of Mexico, the Mexican wars of independence, and the revolutionary movement of the 20th century. Prerequisite: Hy 148 or permission. Cr 3.

152. Problems of Latin America—An analysis and evaluation of contemporary Latin American problems. The internal tensions and international relations of the several countries. The rise, spread and development of Castroism in the area. Prerequisite: 6 hours of history or permission. Cr 3.

155.156. History of England—The political, socioeconomic and constitutional aspects of British history from Roman Britain to contemporary Britain. Emphasis on economic growth and the development of political democracy. Prerequisite: Hy 5.6 or 6 hours of Hy. Cr 3.

157. France in America to 1763—French empire in St. Lawrence Valley, Acadia, Louisiana, and sugar islands from exploration to loss of her main American holdings. Emphasis on political and social institutions; French colonial life compared to France and to the English colonies. Prerequisite: Hy 3.4 or Hy 5.6 or permission. Cr 3.

158. History of French Canada and Franco-Americans—The common historical heritage of French Canadians and Franco-Americans from the establishment of New France and Acadia to the great migrations to the United States in the 19th century, and the separate development of French Canadians and Franco-Americans after that. 6 hours of Hy. Cr 3.

159.160. History of Canada—Canada's history from New France to the present, emphasizing Canadian-American relations, Canada's develoment as a nation within the British Empire-Commonwealth, and the historical background of contemporary social and economic issues. Prerequisite: Can 1, or 6 hours of history, or permission. Cr 3.

161. America Takes Shape: The Colonies to 1740—The founding and development of the American colonies. The expropriation of Indian lands, enslavement of blacks, the role of women, the American family, and internal conflicts will be emphasized. (Fall) Prerequisite: Hy 3 or permission. Cr 3.

162. Rebellion and Revolution in America, 1740-1789—The social tensions of a maturing society: rebellions, religious revivals, violence. The origins and consequences of the American Revolution. Founding fathers and the new Constitution. (Spring) Prerequisite: Hy 3 or permission. Cr 3.

163. Creating the American Nation, 1789-1824—The process and problems of establishing a stable society, politically, economically, and culturally. Examination of major events and issues, with emphasis upon the interrelationships between actions and ideas. (Fall) Prerequisite: Hy 3 or permission. Cr 3.

164. Testing American Democracy, 1824-1850—Social, economic, and political development; industrial growth, sectional interaction, the slavery crisis, reform, and related issues. Emphasis on the examination of democratic institutions and assumptions. (Spring) Prerequisite: Hy 3 or permission. Cr 3.

165. Civil War and Reconstruction, 1850-1877—The social, economic, political, and constitutional changes surrounding sectional conflict and national reconstruction. Westward expansion, evolving labor systems, economic growth, new party formation, and efforts to reform and restructure society. (Fall). Prerequisite: Hy 4 or permission. Cr 3.

166. Industrialization, Urbanization, and Reform, 1877-1916—The transformation of the United States to a predominately industrial, urban society. Business growth, farm problems, immigration, labor organization, regular and reform politics, and imperialism. (Spring, 1978). Prerequisite: Hy 4 or permission. (Spring) Cr 3.

167. Early 20th Century America, 1914-1945—The Wilson era of reform and intervention in World War I, the age of business, depression and the New Deal of FDR, World War II and American global power. Changes in American politics, economics, society, and culture. (Fall) Prerequisite: Hy 4 or permission. Cr 3.

168. America Since 1945—The Cold War and McCarthyism, affluence and poverty in the 1950s, protest movements of the 1960s, Watergate, the energy crisis and economic recession. Changes in American politics, economics, society, and culture. (Spring) Prerequisite: Hy 4 or permission. Cr 3.

169.170. American Ideas—Major ideas emerging from and shaping the American experience. Formal ideas as well as broad social movements considered, e.g. transcendentalism, pragmatism, and reform. Interrelationships between ideas and actions, conceptualizations and structures. (Annually). Prerequisite: Hy 3.4 or permission. Cr 3.

171.172. Economic History of the United States—The development of the American economy from the colonial period to the present, including agriculture, trade and commerce, industrialization, transportation, money and banking, changing concepts of business enterprise and American capitalism, the US in a world economy and the growth of governmental involvement in the economy. First semester: to 1865. Second Semester: 1865-present. Prerequisite: Hy 3.4 or permission. Cr 3.

173.174. American Diplomatic History—American diplomatic history from the revolution to the present. The formation and application of America's major foreign policies. Prerequisite: Hy 3.4 or permission. Cr 3.

175.176. American Social History—Analysis of the ways in which social values, practices, and institutions have changed or persisted as the US evolved from an agrarian to an industrialized society, concentrating on work patterns, ethnic and racial variations, family function, class structure, religious and educational institutions, distinctive roles determined by age and sex, and the means employed for community service and social control. First semester: 1607-1850; second semester: 1850-1970. Prerequisite: Hy 3.4 or permission. Cr 3.

177. History of the Treatment of the American Environment—The attitudes, policies, and behavior of Americans and their government toward the enviornment. Current issues evolving out of past attitudes and policies. (Spring). Prerequisite: Hy 3.4 or two one-semester courses in natural sciences or permission. Cr 3.

180. Naval History—Navies in the broadest strategic context from the Minoans to the present. Maritime empires, administration, technology and the evolution of tactics. Prerequisite: Hy 3.4 or permission. Cr 3.

181. History of the West—The westward movement with emphasis on the trans-Mississippi West. Topics covered include the fur trade, explorations, transportation, farming, ranching, mining, Indian relations and the twentieth-century West. Prerequisite: Hy 3.4 or permission Cr 3.

183. American Maritime History—America's involvement with the sea from colonial times to the present. Economic importance of maritime trade, shipping and resources. Relationship of these factors to science, technology and society. Prerequisite: Hy 3.4 or permission. Cr 3.

185.186. Man and the Sea; World Maritime History—The growth of human understanding, use and interaction with the seas from prehistory to the present. Demographic and social effects of the seas on human populations, marine technology, economics of the seas, national

and international ramifications, contemporary problems. First semester: to 1800; second semester: 1800-present. No freshmen. Cr 3.

193.194. Man, Machine and Society—The development of technology and its impact on society from earliest times through the 20th century. The first half concentrates on Western technology through the Industrial Revolution; the second half focuses on America in its role as both borrower and inventor of technology. No freshmen. Cr 3.

197. History Media Production—The learning of media skills and history through supervised student creation of short multi-media or videotape productions. (Spring) Prerequisite: 6 hours of history. Cr 3.

199. Contemporary Problems in History—An analysis in depth of a selected controversial and contemporary historical problem. The topic to be studied and the method of approaching it will be chosen jointly by interested students and the staff. Prerequisite: permission. Cr 3.

Graduate Courses

Hy 201. Advanced Reading Seminar—American Diplomatic History. Cr Ar

Hy 202. Advanced Reading Seminar—American Intellectual History. Cr Ar

Hy 203. Advanced Reading Seminar—American Regional History. Cr Ar

Hy 204. Advanced Reading Seminar—American Economic History. Cr Ar

Hy 205. Advanced Reading Seminar—American Political History. Cr Ar

Hy 206. Advanced Reading Seminar—American Social History. Cr Ar

217. Early Modern England—Problems, ideas, institutions and developments in the Tudor-Stuart period. Readings, reports and research papers in politics, religion, economic and social change, colonial and foreign policy. Cr 3.

218. Readings Seminar in Modern European History—Important recent books and articles in modern European history. Emphasis on publications and historical problems which have applicability to the teaching of European and world history on the secondary school and college levels and on preparation for graduate study in European history. Prerequisite: senior history majors and graduate students. Cr 3.

219. Modern England—Evaluation of selected problems in English history since 1815. Among areas to be treated are the gradual democratization of the British government, continuing industrial revolution, and impact of two world wars on English social, cultural and political life. Lectures, readings, class reports, research papers. Cr 3.

221. Canada and the United States, 1783 to the Present—Wars, migrations, boundaries, resources, and trade, emphasizing the historical background to contemporary political, strategic, economic, and cultural issues in Canadian-American relations. Prerequisites: Hy 159.160, or Hy 173.174, or Pol 174, or permission. Cr 3.

222. Canadian Economic History—History and theory of Canadian staple development; political influences on land, resource, and industrialization policy; the social contexts shaping Canadian business elites and laboring classes; contemporary trends. Prerequisite: Hy 159. 160, or Hy 171, 172, or Ec 138, or ARE 171, or permission. Cr 3.

IDL 237. (Hy, Pol 237) The Evolution and Development of Canadian Government and Politics—The theoretical structure and historical development of government and politics in Canada. (Not offered 1980-81, alternates with Hy 222) Prerequisite: Pol. 135, Hy 160 or permission. Cr 3.

240. Readings Seminar in Modern Asian History—A research-oriented study of the major themes of Asian history in the 19th and 20th centuries. Impact of Western colonialism, rise of nationalism, emergence of contemporary leadership in East, Southeast, and South Asia. Prerequisite: graduate students. Senior history majors and others by permission. Cr 3.

250. Readings in Bibliography and Criticism In—

B. European History Cr Ar.
C. British and Commonwealth History Cr Ar.
D. Canadian History Cr Ar.
E. Latin American History Cr Ar.
F. Asian History Cr Ar.

251. Latin America and the United States—United States participation and intervention in Latin American affairs from the early 19th century to the present. Lectures, readings, class reports, and research papers. Cr 3.

260. Agricultural History of the United States—Rural life in America. Selected studies in agricultural techniques, inventions, capitalization, rise of agriculture as a business. The relationship of government and agriculture. Lectures, readings, class reports, and research papers. Cr 3.

261. Urban History of the United States—Rise of the city in America and the development of urban patterns of life. Population shift to the cities, development of slums and ghettos, growth of municipal institutions and services, and relationship of government with city dwellers. Lectures, readings, class reports, and research papers. Cr 3.

270. Government-Business Relations in American History—Federal regulation of business, antitrust policy, government as entrepreneur and as manager of the economy viewed in historical perspective. Lectures, readings, class reports, and research papers. Prerequisite: graduate students; senior history majors and others by permission. Cr 3.

283. The Maritime Frontier: Policies and Affairs—Relationship of maritime activity to national development from colonial times to the present. Technological developments, unionization, international competition, relationships to foreign policy, and special assistance to the maritime industries. Governmental policies affecting the use to which the ocean is put as an economic resource, ranging from the fisheries to oil drilling. Prerequisite: permission of instructor. Cr 3.

285. New England History—History of the region: *inter alia* the beginnings, the New England town, social mobility in 19th century New England. Discussions, lectures, readings, class reports, and papers. Cr 3.

297. Field Work in Historical Institutions—Field Work in local museums, state agencies and other historical agencies. Preparation and repair of exhibits, research and preparation of historic preservation documents, beginning archival and artifact handling. (Annually, on demand) Prerequisite: senior history majors and graduate students and permission. Cr 3 to 12.

299. Special Topics in History—A flexible course designed to explore and analyze new trends in research and interpretation in history. Prerequisite: graduate students; senior history majors and others by permission. Cr 3.

(300-level courses are listed in the Graduate School Bulletin)

HONORS PROGRAM (Hr)

The Honors Committee of the College of Arts and Sciences consists of W. Baker, R. Bonnichsen, H. Borns, J. Bost, P. Camp, R. Carroll, N. Cazden, J. Coupe, R. Frey, R. Ghiz, J. Hakola, B. Hamilton, V. Hartgen, M. Hartman, K. Hayes, E. Holmes, H. Maccoby, C. Major, J. Nolde, E. Northam, E. Schriver, C. Scontras, D. Smith, R. Thomson, and R. Tredwell; S. Schuman, Director of the Honors Program is Secretary for the Committee

Freshmen of marked academic ability enrolled in all colleges are invited to apply for admission to the sequence of honors courses described below. The work of the freshman and sophomore years, under the direction of staff drawn from all colleges of the University, provides the stimulus and the guidance which should enable a superior student to begin building a balanced view of the liberal arts and sciences and to lay a foundation for the more specialized work which is to come. The Honors Program reaches its climax in a project which is written during the senior year and treats some special area within the student's major field. Students may be admitted at any stage of the Honors Program up to the opening of the junior year. Of the courses listed below, Hr 41, 45, 47, and 48 are taken in common with students from other colleges within the University. These courses, plus Hr 151, 152 and 153.154 constitute the core of the Program.

Additional information about the Honors Program and a full description of courses will be found on pages 27-28 of this catalog.

Hr 41.45 and 47.48 meet the College of Arts and Sciences requirements for Introductory and Survey Courses.

41. Honors Freshman Seminar

45. Honors Colloquium

46. Honors Summer Readings

47.48. Honors Group Tutorial

49. Honors Summer Readings

60. Honors Independent Study

61. Honors Research Assistantship

62. Honors Independent Research

63. Honors Specialized Seminars

150. Honors Seminar

151.152. Honors: Specialized Studies

153.154. Honors Thesis

170. Honors Distinguished Lecture Course

INTERNATIONAL AFFAIRS (Ia)

A major in International Affairs may concentrate in economics, foreign languages, history, or political science.

During the first two years the student of International Affairs should fulfill the basic requirements of the College of Arts and Sciences. Among such requirements students should take Ec 10, Principles of Economics, Hy 3.4, United States History (and/or Hy 5.6, European History), introductory or intermediate courses in a modern foreign language, and Pol 1, American Government. Students should also consult with their department advisers in International Affairs regarding courses that might be advisable to take. To enter the junior year of the program students must have a minimum point average of 2.0 or permission from the Committee on International Affairs.

The essential requirements of the respective programs in International Affairs are:

International Affairs in Economics

1. At least twenty-four (24) hours in economics in addition to Ec 10. Among such courses may be:
   - Ec 136. Marxian Economics
   - Ec 137. Comparative Economic Systems
   - Ec 138. Economic Development
   - Ec 139. International Trade and Commercial Policy
   - Ec 270. Economic Theory and Policy
   - IDL 158. Culture and Economic Development
2. At least nine (9) hours each in history and political science from among the following courses or from among others with an international focus:
   a. History
      - Hy 8. Asian Civilization
      - Hy 15, 16. The World in the Twentieth Century
      - Hy 109. Twentieth Century Europe, 1919-Present.
      - Hy 152. Problems of Latin America
      - Hy 173.174. American Dipolmatic History
      - Hy 186. Man and the Sea
      - Hy 221. Canada and the United States 1783-Present

   b. Political Science
      - Pol 21.22. Current World Problems
      - Pol 135. Democratic Governments of Europe
      - Pol 136. Communist Governments
      - Pol 173. International Relations
      - Pol 174. United States Foreign Policy
      - Pol 175. National Security Analysis
      - Pol 187. International Law
      - Pol 188. International Organization
3. At least one year of a modern foreign language beyond the intermediate level.
4. Additional electives relating to international affairs arranged in consultation with the major adviser.

International Affairs in Foreign Languages

1. Twenty four hours above the introductory level in one modern foreign language.
2. At least nine (9) hours each in economics, history, and political science from among the following courses or from among others with an international focus:
   a. Economics (See Economics listing under International Affairs in Economics, 1 above.)
   b. History (See History listing under International Affairs in Economics, 2a above.)
   c. Political Science (See Political Science listing under International Affairs in Economics, 2b above.)
3. Additional electives relating to international affairs arranged in consultation with the major adviser. Highly recommended: a course in contemporary civilization and geography of the culture whose langauge is being studied.

International Affairs in History

1. At least twenty-four (24) hours in history in addition to the introductory courses. Among such courses may be those listed under International Affairs in Economics, 2a, History.
2. At least nine (9) hours each in economics and political science from among the following courses or from others with an International focus:
   a. Economics (See Economics listing under International Affairs in Economics, 1 above.)
   b. Political Science (See Political Science listing under International Affairs in Economics, 2b above.)
3. At least one year of a modern foreign language beyond the intermediate level.
4. Additional electives relating to international affairs arranged in consultation with the major adviser.

International Affairs in Political Science

1. At least twenty-four (24) hours in political science in addition to Pol 1. Among such courses may be those listed under International Affairs in Economics, 2b, above.
2. At least nine (9) hours each in economics and history from among the following courses or from others with an international focus:
   a. Economics (See Economics listing under International Affairs in Economics, 1 above.)
   b. History (See History listing under International Affairs in Economics, 2a above.)
3. At least one year of a modern foreign language beyond the intermediate level.
4. Additional electives relating to international affairs arranged in consultation with major adviser.

Detailed programs covering the last two years of study in each discipline may be obtained from the participating departments or from the Committee on International Affairs, 33 North Stevens, University of Maine, Orono, Maine 04473.

JOURNALISM AND BROADCASTING (Jr and Bd)

Professors Hamilton and Miller; Associate Professor Guesman (Chairman); Assistant Professors Bowler, McCann and White; Faculty Associates Banfield, Choquet, Platt, Rair, Reilly, Robinson, and Walas.

The chief objective of the Department of Journalism and Broadcasting is to provide a sound academic foundation for the student who intends to make a career in some phase of professional journalistic or broadcasting work. It seeks to achieve this goal by offering the student a comprehensive study program that combines superior professional instruction with a broad education in the liberal arts.

It is a corollary aim of the Department to be of service to the communications media of Maine and elsewhere, to other educational institutions of the state, including the high schools, and to the public at large. Within the limits of space and other facilities upon which journalism and broadcasting majors properly have first claim, the Department endeavors to make its courses of instruction available to all students.

Career Opportunities

The world of journalism and broadcasting today is broader in scope than ever before. It includes newspapers and magazines, radio and television, advertising, public relations, industrial editing, and film production. The talent and skills find application in many other fields—government service and teaching, to name only two.

The Department of Journalism and Broadcasting assists in placement of graduates. Employment requests are received from newspapers, news services, magazines, radio and television stations, advertising agencies, public information and public relations agencies and offices, and from secondary schools.

High Standards

Broad scholarship is emphasized because the successful graduate must be competent to deal with the communications in virtually every form of human endeavor. Professional journalism and broadcasting programs at the University have been developed in response to public and professional needs. These programs, as described by the American Council of Education for Journalism, are distinguished by the following characteristics:

1. They maintain a professional curriculum with one or more sequences leading to a bachelor's degree.
2. They carry on the professional training of general practitioners for the field of journalism and broadcasting while giving due consideration to services to the profession and to research.
3. They strive to serve national media as well as media of their own states.
4. They are committed to a liberal philosophy of professional training that places strong emphasis on liberal arts studies.
5. They provide close relationships between students and teachers.

Pursuing Courses of Study

College of Arts and Sciences students declare their major at the end of the sophomore year. Freshmen and sophomores with a wide variety of interests may find professional satisfaction in a journalistic or broadcasting career and should seek an adviser in the Department early to develop the most useful interdisciplinary program of study.

The undergraduate program offers advertising, broadcast news, and news-editorial sequences leading to a bachelor of arts degree in journalism and a broadcast operations sequence leading to a bachelor of arts degree in broadcasting.

Double majors are permitted for the Journalism/Broadcasting students. A double major (earning both the degrees offered by the department) must complete one of the journalism sequences and the broadcst operations sequence. A minimum of 42 credit hours must be earned in journalism or broadcasting courses.

All majors, both broadcasting and journalism, must complete at least one year of a foreign language for credit, and must satisfy the minimum requirements of the College of Arts and Sciences.

A student must receive a grade of C in any course which is a prerequisite for a journalism or broadcasting course within the core and the chosen sequence.

A grade of C or better is required in all journalism or broadcasting courses required for graduation and in all courses submitted to satisfy the option requirement.

Students in the College of Life Sciences and Agriculture are also offered a minor in journalism as a second field of study.

Prospective majors are expected to be able to type. All departmental course papers must be typewritten.

THE JOURNALISM MAJOR

A student selecting the journalism major will receive a B.A. in journalism upon completion of the required program.

Journalism majors must select and complete one or more of the sequences indicated; advertising, broadcast news or news-editorial, and must complete a minimum of 24 credit hours in journalism. A maximum of 33 credit hours in journalism or broadcasting courses is allowed within the 120 credit graduation requirement.

All majors must also satisfy the option requirement noted below. (See Option Requirement)

Core Courses — Required of all Majors	
Jb 1. Introduction to Mass Communications	3
Jr 31. Reporting and Newswriting I	3
Jb 175. Law of Publications	3
	9
Adverstising Sequence — Required Courses	
Jr 55. Introduction to Advertising	3
Jr 155. Advertising Copywriting and Layout	3
Jr 156. Advertising Media	3
Jr 157. Newspaper Advertising Lab	3
Jr 159. Advertising Campaigns	3
	15
Broadcast News Sequence — Required Courses	
Bd 40. Introduction to Broadcast Production	3
Jr 33. Broadcast Reporting and Newswriting	3
Jr 133A. Broadcast Lab	3
Jr 133B. Broadcast Lab	3
Bd 170. Broadcasting and Government	3
Journalism or Broadcasting Elective	3
	18
News-Editorial Sequence — Required Courses	
Jr 32. Reporting and Newswriting II	3
Jr 130. Copy Editing	3
Jr 131. Newspaper Lab	3
Jr 132. Newspaper Lab	3
Jr 193. Seminar in Journalism	3
	15

The student should also consider the many electives offered in both journalism and broadcasting to round out the program.

Option Requirement — Journalism Majors

All journalism majors are required to choose a program option of not less than 18 credit hours above the introductory level. Several suggested options are listed below. The student may select one of those listed or may design his own in such fields as science, environmental studies, education, social welfare, speech, economics, or others. The option should be selected in consultation with and approval by the faculty adviser, preferably at the time the major is declared, but not later than the beginning of the final year of course work. A grade of C or better is required in all courses submitted for option approval.

Public Affairs Option—For the student preparing for news work involving government and society in the United States. Required courses: Pol 158, Public Opinion; Ec 144, Urban Economics or Ec 172, State and Local Government. Recommended courses include Pol 133, The American City; Pol 134, Municipal Administration; Pol 151, Public Administration; Pol 154, Public Budgeting and Financial Administration; Pol 159, Problems of American Government; Pol 160, Problems of State Government; Ec 137, Comparative Economic Systems; Ec 139, International Trade; Ec 145, Regional Economics; Ec 168, Social Control of Business; Ec 176, Economics of Technological Change. Other intermediate or upper level courses in Economics, History, Political Science, Speech and Sociology may be selected after consultation with the adviser.

Foreign Affairs Option—The student must complete work in at least one language (French, German, Russian or Spanish) up to at least the 7/8 course level. In addition, he should select 18 hours in other courses appropriate for a background in international affairs. Some recommended courses: Ec 137, Comparative Economic Systems; Ec 139, International Trade; Hy 173,174, American Diplomatic History; Jr 14, Foreign Press; Pol 173,174, International Relations; Pol 187, International Law. Other courses should be chosen after adviser consultation and approval.

Art, Literature and Humanities Option—For the student interested in this broader background as preparation for a writing or broadcasting career. Students must elect 18 hours

from courses in art, folklore, music, theater, English and American literature and comparative literature. With the help of his adviser, the student may also select from a few other appropriate course areas.

Management and Sales Option—For a student preparing for a specialized career in advertising sales, management, or media work. Required courses: Ba 123, Management and Organization; Ba 163, Marketing. Recommended courses include Ba 161, Personnel Management; Ba 164, Organization and Behavior; Ba 167, Sales Management; Ba 169, Marketing Research; Ba 171, Consumer Behavior; Sc 57, Business and Professional Speaking; Py 103, Application of Behavior Principles; Py 130, Social Psychology; Py 151, Motivation; Pol 158, Public Opinion. Other intermediate or upper level courses in business, psychology, speech, and economics may be selected after consultation with the faculty adviser.

Creative Advertising Option—For the student preparing for a specialized career in the creation and preparation of advertising layout and copy. Students must select 18 credit hours from courses in art, English (advanced writing courses) or psychology. With approval of the adviser the student may select appropriate courses in other areas.

Broadcast News Option—For the student preparing for newswork involving government and society in the United States, with emphasis on the broadcast media. Required courses include Bd 40, Introduction to Broadcast Production (if not taken as part of a journalism sequence); Pol 158, Public Opinion; Ec 144, Urban Economics or Ec 172, State and Local Government. Recommended courses include Pol 133, The American City; Pol 134, Municipal Administration; Pol 151, Public Administration; Pol 154, Public Budgeting and Financial Administration; Pol 159, Problems of American Government; Pol 160, Problems of State Government; Ec 137, Comparative Economic Systems; Ec 139, International Trade; Ec 145, Regional Economics; Ec 168, Social Control of Business; Ec 176, Economics of Technological Change. Other intermediate or upper level courses in economics, history, political science, speech and sociology may be selected after consultation with the adviser.

JOURNALISM (Jr) AND JOURNALISM/BROADCASTING (Jb)

1. Introduction to Mass Communications—An introductory course in the structure and operation of modern news media and the social and political implications of their activities. Open to all freshmen and sophomores. Cr 3.

11. History of American Journalism—A review of the newspaper's role in American history, the development of modern mass communications. Cr 3.

14. The Foreign Press—Survey of the world press; its role in political, economic and cultural development. Cr 3.

16. Introduction to Photojournalism—For students desiring an understanding of photography as an effective medium of communications. Classroom and darkroom instruction. Basic principles of processing, composition, and the uses of photography in various media. (Not offered every year.) Cr 3.

31. Reporting and Newswriting I—A basic course in newswriting and reporting; intensive practice in developing newswriting techniques, accuracy, style, judgment and responsibility. Prerequisite: not open to freshmen. Cr 3.

32. Reporting and Newswriting II—Further development of news gathering and reporting techniques, with emphasis given to in-depth, investigative reporting. Prerequisite: Jr 31. Cr 3.

33. Broadcast Reporting and Newswriting—Development of news gathering and reporting techniques for radio and television, with emphasis on the unique limitations, advantages, and responsibilities of the broadcast journalist. Prerequisite: Jr 31 and Bd 40. Cr 3.

51. Media Operation and Management—Basic principles and methods of operation and management applied to the mass media. Emphasis on comparison and contrast among the media in circulation, advertising, business, and editorial operations. Cr 3.

55. Introduction to Advertising. Social and economic roles of advertising. Rate structure, agency practices, effective use of media. Advertising laws analyzed and discussed from the media point of view. Cr 3.

110. Newspaper Design—An advanced course explaining and applying the elements and philosophy of newspaper design. Prerequisite: 9 credits of journalism. Cr 3.

130. Copy Editing—A lab course, centered on operation of the modern news desk, aimed at developing editorial judgment and skills in preparing news for publication. Prerequisite: Jr 32 or Jr 33. Cr 3.

131/132. Newspaper Laboratory—Designed to give students a variety of practical experiences as staff members of the *Maine Campus*. The two labs must be taken in consecutive semesters. Prerequisite: Jr 32. Cr 3 each.

133A/133B. Broadcast News Laboratory—Designed to give students a variety of practical experience in broadcast news with the campus radio station, public broadcast facilities and commercial stations. Prerequisite: Jr 32 or Jr 33 and Bd 41 or equivalent. Cr 3 each.

134. Editorial and Opinion Writing—A course in writing persuasively and argumentatively, but with disciplined logic and upon adequate factual knowledge of other opinions and of the subject. Prerequisite: at least 12 hours of Journalism, including Jr 32. Cr 3.

135. Magazine Article Writing—An advanced course in developing style and proficiency in the craft of writing non-fiction magazine articles. Prerequisite: Jr 32 or permission of instructor. Cr 3.

155. Advertising Copywriting and Layout—Survey and practice in the basic elements of the advertising communication process. Examination of various creative technique for the mass communications media. Prerequisite: Jr 55. Cr 3.

156. Advertising Media—Problems and procedures of the advertising industry as they pertain to media selection, support, promotion, research, organization, and consumer understanding. Prerequisite: Jr 55 or consent of faculty. Cr 3.

157. Newspaper Advertising Lab—Designed to give students a variety of practical experiences in newspaper advertising. Required of all advertising sequence majors. Prerequisite: Jr 155 or 156. Cr 3.

159. Advertising Campaigns—A study of the advertising campaign, with emphasis on both practical and theoretical aspects of promotional strategy, creative effort, and advertising research. Prerequisite: Jr 157. Cr 3.

175. Law of Publications—A study of the legal systems affecting the publishing and broadcasting worlds. Topics include libel, privacy, contempt, copyright, obscenity, censorship, prejudicial pre-trial publicity, and others as they develop within the society. Cr 3.

191. Internship—Practical professional experience with selected mass communications media, approved by the department and under the direction of a qualified supervisor. Work performed must provide meaningful relationship between communications media and academic program. Prerequisite: Permission only. Cr 1-6.

193. Seminar in Journalism—A seminar for seniors with different topics each semester as new situations in the field develop. Frequent guests will act as discussion leaders. Prerequisite: Jr 32 or 33. Cr 3.

198. Special Topics Lab—A variety of lab topics offered on a non-regular basis. Prerequisite: Jr 32 or Jr 33 or permission. Cr 3.

THE BROADCASTING MAJOR (Bd)

The Broadcasting area in the Journalism and Broadcasting Department offers a specialized program of study designed for those students seeking to enter the Broadcasting field at the small and medium market level. The academic program leads to the degree Bachelor of Arts in Broadcasting. Courses are also open to general students who seek to deepen their understanding of these media and to gain a working knowledge of creative skills and methods.

Student majors follow a prescribed sequence of courses in the area and must also select supporting subjects in an option relevant to their professional goals.

Specific Requirements in the Broadcasting Major

The broadcast major must take a minimum of 24 credit hours of course work in the department. A minimum 18 credit hour option area outside the department but supportive of the student's specific goals is also required.

All broadcasting majors should refer to the journalism course listings above for descriptions of Jb 1, Jr 33, Jb 51, Jr 133A/133B, Jb 175, and Jb 198.

All students are invited to apply for staff positions or program assignments with radio station WMEB-FM, which is operated by the department as a year-round radio service for the University community and the general public. Work-study opportunities with local and regional radio, TV and film facilities are available to major students on a selective basis.

Core Courses Required — All Broadcasting Majors	
Jb 1. Introduction to Mass Communications	3
Bd 12. History of Broadcasting	3
Bd 36. Writing for Broadcasting	3
Bd 40. Introduction to Broadcast Production	3
Bd 170. Broadcasting and Government	3
Bd 176. Broadcast Programming	3
	18
Other Degree Requirements	
Group A (One Course Required)	
Bd 41. Audio Production Techniques	3
Bd 42. Television Production Techniques	3
Bd 43. Film Production Techniques	3
Group B (One Course Required)	
Jr 33. Broadcast Newswriting and Reporting	3
Jb 51. Broadcast Management	3
Jb 175. Law of Publications	3
Bd 196. Topics in Broadcasting	3
Electives	
Jr 133A/133B. Broadcast News Lab	3
Bd 136. Writing Workshop	3
Bd 140. Production Workshop	3
Bd 144. Radio Laboratory	Var.
Bd 191. Internship in Broadcasting	Var.
Independent Study in Broadcasting	Var.

BROADCASTING (Bd)

12. History of American Broadcasting—Survey of the radio and television media and related communications services as they function in the United States. Developmental history, social, economic, and political influences, systems of content and dissemination. Cr 3.

36. Introduction to Broadcast Writing—Basic writing skills for the broadcast media. Exercises in commercial and public service copywriting, continuities and promotion, newswriting, editorial copy and short features. Cr 3.

40. Introduction to Broadcast Production—An exploration of the theory and practice of the creation of sound and images for radio, TV and film. Cr 3.

41. Audio Production Techniques—The creative application of audio techniques as applied to radio and television. Prerequisite: Bd 40, Bd 36. Cr 3.

42. Television Production Techniques—Creation, production and direction of television and video presentations concentrating on imaginative and original uses of television and video techniques. Prerequisite: Bd 40, Bd 36. Cr 3.

43. Film Production Techniques—Theory and practice of making films, including experiences in shooting, planning, and editing short films ranging from animation to short documentaries. Student fee to cover costs of film and processing. Prerequisite: Bd 40, Bd 36. Cr 3.

136. Broadcast Writing Lab—Writing experience for advanced students in the design of original dramatic scripts, adaptations and documentaries for radio and television. Prerequisite: Bd 36. Cr 3.

140. Broadcast Production Laboratory—Production experiences for advanced students providing the opportunity to work on the planning, creation and execution of sophisticated radio, television or film projects. Prerequisite: Bd 41, Bd 42 or Bd 43. Cr 3.

144. Radio Lab—Experience in radio programming, production and administration through positions with the campus station, WMEB-FM. Prerequisite: Bd 41 and/or permission. Cr 1. (Repeatable to 3 hours)

170. Broadcasting and Government—The relationship between station operation and governmental policy and regulation. Special emphasis on the licensee's public service responsibilities as established by legislative and judicial precedents. Prerequisite: Bd 12. Cr 3.

176. Broadcast Programming and Criticism—Programming practices, strategies and conventions in terms of broadcast history, economics and socio-cultural factors. Critical analysis of contemporary program trends in television and radio. Prerequisite: Bd 12. Cr 3.

191. Internship—Selected students gain practical experience by working in various capacities at radio or television stations, film production facilities, or other related professional activities. Limited to seniors and by permission. Cr 1-6.

196. Problems in Broadcasting—Special topics and problems in Broadcasting and Film, including criticism and analysis. Prerequisite: permission. Cr 3.

Options for Broadcasting Majors

Each major will be required to choose a program option of not less than 18 credit hours above the introductory level. Two suggested options are listed below. A student may design his own option in consultation with adviser.

Management and Sales Option—Required courses: Ba 123, Managment and Organization; Ba 163, Marketing. Recommended courses: Ba 161, Personnel Management; Ba 164, Organization and Behavior; Ba 167, Sales Management; Ba 171, Consumer Behavior; Py 103, Application of Behavior Principles; Py 130, Social Psychology; Py 151, Motivation; Sc 57, Business and Professional speaking.

Production and Performance Option—Required courses: Th 166, Stage Directing; Th 167, Advanced Acting. Recommended courses: Th 14/15, Stagecraft; Th 163, Scene Design; Th 164, Stage Lighting; Sc 56, Advanced Oral Interpretation; Sc 77, Interviewing; Sc 190, Ensemble Interpretation; At 7, 8, 9, Design and Graphic Arts.

Internships

Internships offering the student professional experience for academic credit are available from all areas of Maine's and New England's mass communications media. The location of the Orono campus, just ten miles from Bangor, affords the major countless opportunities to work with the city's daily newspaper, *The Bangor Daily News*, or with the several commercial radio stations and three commercial television stations.

Facilities

Journalism facilities include laboratories for newswriting, editing and advertising equipped with typewriters, layout tables and other necessary equipment. All students have access to video display terminals (VDT's) for writing and editing.

Associated with the program are two student publications, the daily student newspaper, *The Maine Campus* and the yearbook, *The Prism*. Both have editorial and business offices, photography darkrooms and production rooms. The *Campus* is equipped with the latest photocomposition typesetting and processing equipment.

Students associated with the *Campus*, which serves as the newspaper laboratory, have access to Associated Press wire services.

The department shares with the Physics Department a fully equipped laboratory for photography classes.

Broadcasting facilities include the campus radio station, WMEB-FM, a 380 watt, noncommercial outlet and television production studios. Students have access to the radio and television facilities of the Maine Public Broadcasting System.

MATHEMATICS

Professor Haggard (Chairman); Professors Langford, Mairhuber, Northam, Pogorzelski; Associate Professors Balakrishnan, Beard, Bresinsky, Brown, Byther, Dodge, Dube, Farlow, Feichtinger, Ferguson, Geiger. R. Gupta, Hamm, Hannula, Locke, Murphy, Puri, Soule, J. Toole, Wohlgemuth; Assistant Professors Carter, Fuentes, P. Gupta, Halteman, Rosen, Snyder, Stearns; Instructors Manson, B. Toole, Zander; Graduate Assistants Hunter, Smith, Sonti, Willett

Students majoring in mathematics may choose the standard mathematics program (A) or the applied mathematics option (B).

(A): At least 39 hours of mathematics courses plus Cs 83 are required in this program. Required courses are Ms 26, 27, 28, 125/126, 161, 162, 163, at least one of Ms 151, 152, 153, 159, 187, at least one of 134, 155. Courses numbered below Ms 22 do not count toward the 39 hours; however, one Cs course above Cs 83 may be included in these 39 hours. It is possible to obtain advanced placement, or to be excused from elementary courses by passing proficiency examinations for the department. A foreign language is strongly recommended.

(B): To qualify for the applied mathematics option students must take Ms 26, 27, 28, 59, 134, 153, 155, 162, 187. Students must also take at least *two* courses from Ms 125, 135, 139, 151, 154, 156, 159; one of which must be selected from 125, 151, 154, 159. Physics 1, 2 and Cs 83 are required. Students must complete an 18-hour concentration of approved courses in some area other than mathematics, or two 12 hour concentrations in outside areas. These concentrations may be elected in the following areas: Agricultural Engineering, Chemical Engineering, Chemistry, Civil Engineering, Computer Science, Electrical Engineering, Mechanical Engineering, Physics. Students electing Physics for their 18-hour concentration may not count Ps 1 or Ps 2 in their total. Also, students electing computer science cannot count Cs 83 as part of their 18 hours.

The student's program of elective courses for the junior and senior years will depend upon his vocational plans. In selecting these courses the mathematics major will be assisted by an advisor assigned to the student by the department. The required courses demanded of all mathematics majors has been selected as being necessary for work in any branch of mathematics.

The general requirements for the Master of Arts are given in the Graduate School catalog. Candidates for this degree in mathematics are expected to have substantial undergraduate training in this subject.

The course numbering scheme uses the tens digit of the course number to designate the area of the course according to the following table.

1-19	100-119	200-219	General Service, Education
20-29	120-129	220-229	Analysis
30-39	130-139	230-239	Statistics
40-49	140-149	240-249	Logic Foundations, History
50-59	150-159	250-259	Applied Mathematics and Operations Research
60-69	160-169	260-269	Algebra
70-79	170-179	270-279	Geometry and Topology
80-89	180-189	280-289	Computer Science (Math)

Computer Science (Cs)

Ferguson (Chairman), Byther, Corcoran, Dube, Field, Freeman, Haggard, Johnson, McConnell, Mumme, Northam, Rowe

The Computer Science program resides in the College of Arts and Sciences and therefore students must be admitted to this college as well as satisfying the College requirements. The College requirements are outlined elsewhere in the catalog.

The Computer Science requirements are as follows. Required courses are: Cs 83, 175, 177, 182, IDL 183, 186, 189, 190, 199, and a course in simulation. Cs 83 can be taken in the spring of the freshman year. In addition to the above required courses, each student must take Sc 2, Ec 10 (Ba 9 is also strongly recommended), and one of the three statistics courses, Ms 15, 19, 134 (or equivalent). All Computer Science majors must work on a summer project sometime before enrolling in Cs 199.

Along with the required courses all majors must complete a minor in some area relating to computer science. This minor must be approved at the time of entry into the program—normally before the student enrolls for the junior year.

Undergraduate courses

81. Computer Programming—Programming logic and techniques using a higher level language (usually FORTRAN). Introductory hardware concepts are covered as needed. A service course. Students are assigned programs from various areas of application and these programs are run on the University's computer. Cr 3.

83. Introduction to Computer Science I—Programming logic and techniques. Introduction to machine language, concentrates on one high level language, typically FORTRAN. Student programs run on the University's IBM 370 computer. Cr 3.

98. Topics in Computer Science—Topics in computer science at the survey or introductory level not regularly covered in other courses. Content is not fixed, but can be varied to suit current needs. The course may, with permission, be taken more than once. Prerequisite: permission. Cr 1 to 3.

161. Interactive Computer Graphics—Topics include graphic I/0 devices: plotter, CRT, light pen, etc.; vector generation; transformation of two/and three-dimensional objects; clipping and windowing; hidden line removal; interrupt handling; interactive techniques; data structures for graphics; and various display algorithms. Prerequisite: Cs 81—FORTRAN, Cs 83, or equivalent. Cr 3.

175. Computing Management—Introduces and correlates the diverse executive and administrative techniques which are used in making managerial decisions in a computing environment.Prerequisite: Cs 182. Cr 3.

177. Information Analysis and Systems Design—Provides the knowledge and tools necessary to analyze problems of information gathering and processing, develops logical and physical designs and operational systems to solve them. Also develops techniques for estimating the cost of the system and evaluating its performance. Prerequisite: Cs 186. Cr 3.

182. Introduction to Computer Science II—More emphasis on non-numeric algorithms and implementation of these algorithms in PL/I. Files, data structures, sorting, text processing,program standards and program efficiency. Prerequisite: CS 83. Cr 3.

IDL 183. Computers and Society—Consideration of the human and social consequences of the technological development and application of computers as viewed from the standpoints of the computer customer, the computer specialist, and the public. Prerequisite: junior standing. Cr 3.

186. Programming Languages—Formal description of programming languages including specification of syntax and semantics. Discussion of infix, prefix, and postfix notation with translation techniques. Topics include branching, grouping of statements, storage allocation, list and string processing, relation of language design on efficiency. Prerequisite: Ms 182 or equivalent. Cr 3.

189. Computer Architecture and Assembler Language—Introduction to concepts of modern computers, instruction formats, addressing techniques. Input-output processes and interrupt handling. Programming aspects include assembler program segmentation and linkage. A specific assembler used to illustrate various topics. Prerequisite: CS 83 or equivalent. Cr 3.

190. Operating Systems—Study of the structure of current computer operating systems. Topics include I/O management, memory management, multiprogramming, linking loaders, real and virtual systems, batch and time sharing. Prerequisite: Cs 189. Cr 3.

198. Topics in Computer Science—Topics not regularly covered in other courses. Content is not fixed, but can be varied to suit current needs. May be taken more than once. Prerequisite: permission. Cr 1 to 3.

199. Senior Project—This course consists of two parts. The first part entails the completion of an on-the-job work project by the student. The second part is a seminar devoted to an analysis of the student's work experience. Prerequisite: permission. Cr 3.

MATHEMATICS (Ms)

GENERAL SERVICE EDUCATION

Undergraduate Courses

5/6. Elements of College Mathematics—Number theory, analytic geometry and geometric constructions, introduction to computing, discrete modeling in the social sciences. Cr 3.

7/8. The Structure of Arithmetic—A development of the real number system beginning with the sub-system of natural numbers and generalizing through the systems of integers, rational numbers, and real numbers. Properties of numbers, relations, and operations. Details of numeration systems. Primarily for the elementary school teacher. Cr 3.
(Note: Ms 7/8, Ms 9, Ms 10 may not be taken for credit by A & S students.)

sion depends upon performance on a departmental qualifying examination given during summer orientation and the first day of class. A maximum of four credits is allowed for Ms 11, Ms 12 and Ms 22. Cr 4.

23.24 Enriched Calculus and Analytic Geometry—Topics covered are essentially those covered in Ms 26, 27, but theoretical concepts receive greater stress, and problems of greater depth and scope are considered. Prerequisite: high school mathematics through trigonometry. Admission depends upon performance on a departmental qualifying examination given during summer orientation and the first day of class. Cr 4.

26. Analytic Geometry and Calculus—Equations and graphs, differentiation and integration of simple functions, applications. Prerequisites: the equivalent of Ms 22. Admission to course requires passing departmental examination. Cr 4.

27. Analytic Geometry and Calculus—Differentiation and integration of algebraic, trigonometric, logarithmic and exponential functions; applications, infinite series. Prerequisite: Ms 26 or permission. Cr 4.

28. Analytic Geometry and Calculus—Geometry of three dimensions, infinite series, partial derivatives; multiple integrals; applications. Prerequisite: Ms 27. Cr 4.

125/126. Advanced Calculus—Functions of real variables, limits, infinite series, partial differentiation, and other topics. Prerequisite: Ms 162. Cr 3.

Graduate Courses

223/224. Functions of a Real Variable—Cr 3.

227/228. Functions of a Complex Variable—Cr 3.

STATISTICS

Undergraduate Courses (See also 15/16 and 19)

134. Introduction to Statistics—Topics include probability, random variables, continuous and discrete distributions, point and interval estimation, tests of hypotheses, simple linear regression and correlation, some analysis of variance. Emphasis on applications. Prerequisite: Ms 28. Cr 4.

135. Introduction to Mathematical Statistics—Topics include moment generating functions, distributions of functions of random variables including sampling distributions, principles of estimation and hypothesis testing, limit theorems, order statistics. Prerequisite: Ms 134. Cr 3.

139. Regression and Analysis of Variance—Topics include the multivariate normal distribution, quadratic forms and projections, least squares estimation, hypothesis testing and confidence regions. Application is made to linear regression and analysis of variance models using matrix algebra. (No previous matrix algebra required.) Prerequisite: Ms 134. Cr 3.

137. Statistical Methods in Research—An introduction to Analysis of Variance and Regression Analysis using a unifying approach to theory; application and illustrations from many fields. Prerequisite: Ms 19 or Ms 137 or permission. Cr 3.

138. Design of Experiments—Continuation of Ms 137, with consideration of non-orthogonal designs in Analysis of Variance, and an introduction to other experimental design techniques which are widely applicable. Prerequisite: Ms 137. Cr 3.

Graduate Courses

231/232. Mathematical Statistics I and II—Cr 3.
233. Stochastic Systems—Cr 3.

LOGIC—FOUNDATIONS—HISTORY

Undergraduate Courses

141. Mathematical Logic—Sentential calculi, deduction theroem and completeness theorem. Prerequisite: One year college mathematics. Cr 3.

9. Informal Geometry—Sets, points, lines, planes, and other configurations of one, two, and three dimensional geometry. Congruences, measurement, and constructions. Primarily for the elementary school teacher. Prerequisite: Ms 8 or permission. Cr 3.

10. Basic Algebra—An introductory treatment of mathematical operations on set symbols including procedures for solving simple equations and inequities. Primarily for the elementary school teacher. Prerequisite: Ms 8 or permission. Cr 3.

11. College algebra—The algebraic material of Ms 22 offered in a format that allows a slightly more extensive treatment. The course provides the transition from high school algebra to the mathematics courses for Social Sciences and Business Administration found necessary for some students. Prerequisite: two units of high school algebra and one unit of high school geometry (knowledge should be current). Admission to course depends upon performance on a departmental qualifying examination given during summer orientation and the first day of class. (May not be used to satisfy the Arts & Sciences Area III requirement.) A maximum of four credits is allowed for Ms 11, Ms 12, and Ms 22. Rec. 3, Cr 2.

12. Transcendental Functions (Trigonometry)—The transcendental (logarithmic, trigonometric and their inverses) function material of Ms 22 offered in a format that allows a slightly extended time schedule. Prerequisites: two units of high school algebra and one unit of high school geometry (knowledge must be current), Ms 11. Admission to the course depends upon performance on a departmental qualifying examination given during summer orientation and the first day of class. A maximum of four credits is allowed for Ms 11, Ms 12, and Ms 22. Rec 3, Cr 2.

13/14. Mathematics for Business and Economics—An introduction to elementary mathematical analysis and the calculus, with applications to business and economics. Mathematical models, elementary functions, systems of equations and inequalities, linear programming, matrix algebra, topics from the calculus. Prerequisite: three years of high school mathematics (knowledge should be current). Admission to the course depends upon performance on a departmental qualifying examination given during summer orientation and the first day of class. Cr 3.

15/16. Introduction to Statistics for Business and Economics—Concepts of probability and statistics emphasizing applications in business and economics. Major topics covered are sampling, estimation, testing, linear models and analysis of variance. Prerequisite: Ms 13/14, or Ms 26. Cr 3.

18. Statistics by Example—Concepts and terminology of statistics are introduced through the study of a wide range of statistical applications. Emphasis is on the commonly practiced techniques and interpretations of statistics. Cr 3.

19. Principles of Statistical Inference—An introductory course including such topics as distributions, sampling variability, estimation, hypothesis testing and regression. Cr 3.

42. Analytic Thinking—A course designed to develop logical reasoning, a facility in algebraic computations and insights into problems through geometric interpretation. A twofold objective is to overcome mathematics apprehensions while increasing quantitative thinking abilities. Cr 3.

105. Mathematics for Teachers—A modern approach to selected topics in mathematics with a critical examination of certain fundamental processes. Prerequisite: Ms 28. Cr 3.

Graduate Course (Ms)

200. Seminar in Mathematics Education—Cr 3.

205. Selected Topics in Mathematics for High School Teachers in Mathematics—Cr 3.

ANALYSIS

Undergraduate Courses

22. Algebra and Trigonometry, Pre-Calculus—An introduction to college algebra and transcendental functions including logarithmic, trigonometric and their inverses as required for further work in mathematics, in particular, the calculus. Prerequisite: two units of high school algebra and one unit of high school geometry (knowledge should be current). Admis-

145. History of Mathematics-Before the 17th Century—Basic developments in mathematics from its origins up to the 17th century. Cr 3.

146. History of Mathematics-The 17th Century and After—Basic developments in mathematics from the invention of analytic geometry up to our times. Prerequisite: Ms 27 or permission. Cr 3.

147/148 Foundations of Mathematics—Fundamental concepts and methods of mathematics; viewpoints on the foundation of mathematics. Not given every year. Prerequisite: Ms 28 or permission. Cr 3.

APPLIED MATHEMATICS

Undergraduate Courses

59. Differential Equations—An introduction to ordinary differential equations; applications. Prerequisite: Ms 28. Cr 4.

151. Introduction to Vector and Tensor Analysis—Scalar and vector fields; Newtonian kinematics and Kepler's laws of planetary motion. Gradient, divergence, and curl; the theorems of Green, Stokes, and Gauss; curvilinear coordinates; contravariant and covariant tensors; absolute derivative of a tensor field; geodesics; Riemannian curvature. Prerequisite: Ms 28. Cr 3.

152. Introduction to Complex Variables—Analytic functions, integration, series, and mappings. Applications. Prerequisite: Ms 28. Cr 3.

153/154. Partial Differential Equations—Introduction to general properties of partial differential equations followed by solutions of specific equations. Techniques include eigenfunction expansions, operational methods, and Green's functions. Prerequisite: Ms 59. Cr 3.

155/156. Introduction to Operations Research—Introduction to linear programming, including the simplex method, Hungarian algorithms, transportation and assignment problems, dual simplex method. Also selected topics for dynamic and non-linear programming, network and game theory. Emphasis on modelling problems arising in business and industry. Prerequisite: Cs 81 or equivalent. Cr 3.

159. Methods of Applied Mathematics I—Advanced theoretical course. Topics covered with applications to physical sciences: complex variables, vector and tensor analysis, series solution of differential equations near singular points, linear algebra and determinants. Prerequisite: Ms 59 or permission. Cr 3.

Graduate Courses

254. Topics in Operations Research—Cr 3.

257/258. Mathematical Programming—Cr 3.

259. Methods of Applied Mathematics II—Cr 3.

ALGEBRA

Undergraduate Courses

161. The Structure of the Real Number System—Development of the arithmetic and order properties of the integers, rationals, and real numbers. Division algorithm, well-ordering, mathematical induction, fundamental theorem of arithmetic, sequences and series, and consequences of the completeness property of the real numbers. Prerequisite: Ms 27. Cr 3.

162. Linear Algebra—An introduction to theory of vector spaces and linear transformations. Prerequisite: Ms 28. Cr 4.

163/164 Introduction to Abstract Algebra—Abstract algebraic structures including groups, rings, ideals, integral domains and fields. Prerequisite: Ms 161 and Ms 162. Cr 3.

165. Theory of Numbers—Elementary properties of integers: divisibility, uniqueness of prime factorization. Prerequisite: Ms 161. Cr 3.

Graduate Course

263/264. Abstract Algebra—Cr 3.

GEOMETRY AND TOPOLOGY

Undergradute Courses

171. Differential Geometry—Applications of calculus to the study of space curves and surfaces. Not given every year. Prerequisite: Ms 28. Cr 3.

172. Complex numbers—The basic properties of the complex numbers and their applications to algebra, geometry, trigonometry, and vector forces. Especially appropriate for mathematics and science teachers. Offered in spring of odd years. Prerequisite: Ms 27, or one year college mathematics and permission. Cr 3.

174. Projectives Geometry—Incidence axioms, perspectives and projectivities, Desargues' Theorem, Pappus; Theorem, Fundamental Theorem, coordination, finite geometries. Prerequisite: Ms 162. Cr 3.

175/176. Higher Geometry—Constructions. Properties of E_2. Ceva's and Menelaus' theorems with applications—Desargues'. Pappus' and Pascal's theorems. Isometrics. Axiometric approach to one of the geometries. Algebraic models for Geometry. Klein's Erlanger program. Classical construction problems. Prerequisite: Ms 28 or permission. Cr 3.

Graduate Courses

277/278. Topology—Cr 3.

COMPUTER SCIENCE (Ms)

Undergraduate Courses

187. Numerical Analysis—Computational methods for electronic computers; exercises on the IBM 370 for interpolation, simultaneous algebraic equations, non-linear and polynomial equations, numerical integration, ordinary and partial differential equations. Prerequisite: Ms 28 and Cs 83. Cr 3.

188. Graph Theory—General survey of a number of topics in graph theory. Topics include: Eulerian and Hamiltonian lines, factors, colorings of graphs, embedding of graphs in surfaces, room squares and various decomposition problems. Prerequisite: Ms 28. Cr 3.

Graduate Course

287. Methods of Numerical Analysis—Cr 3.

SELECTED TOPICS IN MATHEMATICS; THESIS

Undergraduate Courses

0: The tens digit specifies the area in which the course is given. e.g. Ms 60—Topics in algebra.

– 0 Topics in Mathematics—Topics in mathematics not regularly covered in other courses. Content is not fixed, but can be varied to suit current needs. The course may, with permission of the department, be taken more than once. Prerequisite: consent of the department. Cr 1 to 3.

1-0: the tens digit specifies the area in which the course is given. 120—Analysis, 130—Statistics, etc.

1-0 Selected Topics in Mathematics—Advanced topics in mathematics not regularly covered in other courses. The content is not fixed but can be varied to suit current needs. The course may, with permission of the department, be taken more than once. Prerequisite: permission. Cr 2 or 3.

Graduate Courses

2-0: The ten digit specifies the area in which the course is given.

2-0 Advanced Topics in Mathematics—Cr 2 or 3.

399. Graduate Thesis—Cr Ar.

School of Performing Arts

DEPARTMENT OF MUSIC (Mc)

Professors Cazden, Godwin, Jacobs; Associate Professors Collins, Foley, Hall, Hallman*, Heath, Nesbit, Stratton; Assistant Professors Cox, Rains, Stedry**; Instructors Garwood, Heath, MacDonald, Mummé, Saucier, Voronietzky.

The curricula of the Department of Music lead to baccalaureate degrees as follows:

1. Bachelor of Arts Degree with a major in music

This program is designed for the study of music within a strong liberal arts curriculum. It offers a broad coverage of the field of music with emphasis upon the study of the history and theory of music. It furnishes an appropriate background for prospective candidates for advanced degrees who are preparing for such careers as musicologists, composers, and music librarians. It does not qualify the graduate for certification as a public school music teacher. Candidates for the degree are expected to attain a level of performing ability equivalent to that required at the completion of the sophomore year in the Bachelor of Music program. A senior project is required in lieu of a recital. Total number of required semester hours in music: 48.

Music Theory	20
Music History and Literature	10
Performance Emphasis (7 Semesters)	7
Senior Project	1
Music Organization	4
Music Electives (theory or history)	6
	48

2. Bachelor of Music in Music Education

This is a four-year professional degree for students who intend to make music a career either as a public school teacher or supervisor of music. The degree provides for many professional opportunities and serves also as preparation for graduate study in music education. Upon satisfactory completion of the music education course of study the student is certified to teach both elementary and secondary music. A half-hour recital is required in the junior or senior year. Total number of required semester hours in music: 69

Music Theory	22
Music History and Literature	10
Major performance area	12
Music Organization	7
Instrumental concentration or Vocal/Keyboard concentration	18
Music/Professional Education	22
	91

3. Bachelor of Music

This degree is designed to assist the gifted music student to prepare for a career in music performance. It serves also as preparation for graduate study in music and teaching at the college level. Emphasis is placed on performance, music theory, music history, and studies in the liberal arts. The degree is granted in the following applied music areas: Strings, Woodwinds, Brass, Piano, Harpsichord, Voice, and Pipe Organ. Graduation requirements include appropriate proficiency in playing or singing, excellent memory and substantial repertoire, and musicianship of a high order.
A half-hour recital is required in the junior year and a full recital in the senior year.
Total number of required semester hours in music: 84

*on leave Fall 1980
**on leave Fall 1980, Spring 1981

Music theory	28
Music History and Literature	16
Performance Major	16
Performance Minor	4
Music Organization	8
Conducting, Literature	6
Elective in Music	6
	84

A proficiency examination in piano must be passed by all degree students in music. See the music adviser for details.

All entering students are required to take placement examinations in piano and music theory.

Applied Music Fees

1. For the Music Major:
   No fees will be charged for *required* private instruction.
2. For the non-music major and for instruction *not* required of music majors: A fee of $60 per semester will be charged for one ½-hour lesson per week; a fee of $120 per semester will be charged for one 1-hour lesson per week. Private instruction for the non-music major and instruction not required for the music major is contingent upon the availability of time of the instructor. Arrangements for such instruction and assigning of teacher must be made through the office of the Music Division.

Practice facilities are provided in the music building. The University provides, so far as possible, practice opportunities for students who desire to take applied music for credit.

Courses in Music Performance

The Department of Music provides private instruction in various instruments and voice. The student should enroll under one of the following numbers

	Performance Minor B.A. (Major in music) candidates, all others	**Performance Major** B. Mus., B.S. in Mus. Educ. candidates
*First level	Mc 1-2 Cr 1	Mc 10-20 Cr 2
Second level	Mc 3-4 Cr 1	Mc 30-40 Cr 2
Third level	Mc 5-6 Cr 1	Mc 50-60 Cr 2
Fourth level	Mc 7-8 Cr 1	Mc 70-80 Cr 2

* The level is roughly the equivalent of the year, but the student who does not meet the requirements for the level at the end of each year as determined by the jury examination will continue on the previous level until the requirements are met. Students will be reviewed at the end of their sophomore year by a jury composed of the faculty of the Division of Music to determine whether they should be advanced to upper level standing in applied music.

Instruction is provided in the following areas. When enrolling, add the appropriate division noted below after the course number to indicate the instrument or voice.

Example: Mc 10—1 (voice)

Voice,	1	Cello,	6	Bassoon,	11	Tuba,	16
Piano,	2	Bass,	7	French Horn,	12	Percussion,	17
Organ,	3	Flute,	8	Trumpet,	13	Saxophone,	18
Violin,	4	Oboe,	9	Baritone Horn,	14	Harpsichord,	19
Viola,	5	Clarinet,	10	Trombone,	15		

Candidates for B. Mus., B.M. in Mus. Ed. enroll for two hours credit for the major instrument or voice, one hour for the second instrument or voice. B.A. (major in music) candidates, *all other students* enroll for one hour credit.

Courses in applied music and music performance may be repeated for credit.

Each student taking instruction in an applied area must take an examination before a jury of the faculty of music at the end of each semester. Attendance at the Tuesday afternoon student recital is required. Prerequisite: qualifying test; see the Coordinator of the Division of Music.

Mc 98. Senior Project—A research paper, original composition, or by special permission, a lecture-recital presented in lieu of a recital. Required of all music majors in the Bachelor of Arts degree program. Accomplished under the guidance of an assigned faculty member during the senior year. Cr 1.

Musical Organizations and Ensembles (Mc 0)

1.2. University Singers—Rehearsal and performance of choral concert repertoire. Membership through audition requires sight reading ability. Extended concert tours. Four hours of rehearsal a week. Attendance at all rehearsals and public performances required. May be repeated for credit. Lab 4, Cr 1.

3.4. Oratorio Society—Rehearsal and performance of major choral works. Membership through audition. Attendance at all rehearsals and public performances required. May be repeated for credit. Lab 2, Cr 1.

9.10. University chorus—Rehearsal and performance of choral music appropriate for choral singers with limited background and training. No audition required. Open to all students. Attendance at all rehearsals and public performances required. May be repeated for credit. Lab 3, Cr 1.

11. Marching Band—Marches at home and occasional off-campus football games. Begins four days prior to opening of classes. Rehearses concert music on limited schedule during final weeks of semester. Attendance required at rehearsals and performances. Membership by permission of director. May be repeated for credit. (Fall semester only). Lab 4, Cr 1.

12. Concert Band—Rehearses and performs a variety of concert band literature appropriate for the general University instrumentalist. Attendance required at rehearsals and performances. Performs both on and off campus. May be repeated for credit. Membership by permission of director. (Spring semester only). Lab 3, Cr 1.

13. Pep Band—Prepares and performs band music appropriate for athletic events including current marching band selections. Attendance required at rehearsals and performances. May be repeated for credit. Prerequisite: concurrent enrollment in Marching Band (McO11), (Fall semester only). Lab 2, Cr 1.

14. Symphony Band—Rehearses and performs the most challenging and significant band literature. Attendance required at rehearsals and performances. Occasional touring on class days. Membership by audition. May be repeated for credit. Lab 4, Cr 1.

21.22. University Orchestra—Rehearsal and performance of standard orchestral repertoire. Membership through audition. Attendance at all rehearsals and public performances required. May be repeated for credit. Lab 4, Cr 1.

31. Chamber Singers—The study and performance of chamber music for the voice. May be repeated for credit. Lab 2, Cr 1.

32. Opera Workshop—Rehearsal and performance of standard opera repertory. Acceptance by audition. May be repeated for credit. Lab 3, Cr 1.

41. Brass Ensemble—The study and performance of chamber music for brass instruments. May be repeated for credit. Lab 2, Cr 1.

42. Trombone ensemble—The study and performance of music for trombones. May be repeated for credit. Lab 2, Cr 1.

43. 20th Century Music Ensemble—Rehearsal and performance of 20th century music. Membership through audition. Attendance at all rehearsals and performances required. May be repeated for credit. Cr 1.

45.46. Woodwind Ensemble—The study and performance of chamber music for woodwind instruments. May be repeated for credit. Lab 2, Cr 1.

47. Horn Ensemble—Rehearsal and performance of music written for french horns. May be repeated for credit. Prerequisite: permission of instructor. Lab 2, Cr 1.

49.50. String Ensemble—The study and performance of chamber music for string instruments. May be repeated for credit. Lab 2, Cr 1.

Mc O 70. Karl Mellon Clarinet Choir—Rehearsal and performance of music written for clarinet choir. May be repeated for credit. Prerequisite: Permission of instructor. Lab 2, Cr 1.

Courses in Music Education (McE)

1. Music Methods for the Elementary Teacher—Methods and materials for relating music to the elementary school child. No previous experience in music required. Cr 3.

Music theory	28
Music History and Literature	16
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Mc O 70. Karl Mellon Clarinet Choir—Rehearsal and performance of music written for clarinet choir. May be repeated for credit. Prerequisite: Permission of instructor. Lab 2, Cr 1.

Courses in Music Education (McE)

1. Music Methods for the Elementary Teacher—Methods and materials for relating music to the elementary school child. No previous experience in music required. Cr 3.

5-6. Music for the Elementary Classroom Teacher—Basic musicianship and approaches to the musical training of the elementary school child. Emphasis on the achievement and utilization of elemental performance skills in the areas of singing, rhythmic movement, aural analysis, composition, improvisation and instrumental techniques. Lec 1, Lab 2, Cr 2.

7-8. Voice Class—The systematic development of the principles of good singing through class method approach. Prerequisite: McT 1 or equivalent. Lab 2, Cr 1.

9. String Class—Basic performance and pedagogical skills pertaining to each of the four string instruments. Prerequisite: McT 1 or equivalent. Lab 4, Cr 2.

10. Introduction to Music Education—Exposure to classrooms in primary and secondary music settings. Philosophies of music education. Programming and evaluation. Open to all music majors. Cr 2.

13. Woodwind Class—Basic performance and pedagogical skills pertaining to the woodwind instruments. Prerequisite: McT 1 or equivalent. Lab 4, Cr 2.

15. Early Music Teaching Field Experience—Visitations to public school classrooms for observation and teaching experience. Approximately five weeks will be spent in each of three areas: elementary, junior high and high school. Open to freshman or sophomore music education majors. No prerequisites. Cr 2.

17. Brass Class—Basic performance and pedagogical skills pertaining to the brass instruments. Prerequisites: McT 1, or equivalent. Lab 4, Cr 2.

20. Music in General Education—Methods, materials, organization and administration of the music curriculum in the public schools. Prerequisite: McT14 A and McL 22. Cr 3.

21. Teaching of General Music in the Junior High School—Organization and teaching of general music classes in the junior high school. Prerequisite: McE 20 or equivalent. Cr 3.

22. Percussion Class—Basic performance and pedagogical skills pertaining to the percussion instruments. Prerequisite: McT 1, or equivalent. Lab 2, Cr 1.

100. Choral Organization and Development—The organization and development techniques requisite to a successful choral program. Open to all music majors. Offered every two years. Cr 3.

101. Advanced Instrumental Methods and Pedagogy—A culmination of prior skills in a laboratory setting dealing with issues and techniques relative to instrument music teaching. Prerequisites: McP 45, McE 9, McE 13, McE 17, McE 22. Offered every fall. Cr 2.

102. Piano Pedagogy—An introduction to pedagogical materials for piano drawn from available teaching systems and literature. Open to undergraduate piano students. Cr 3.

103. Instrumental Laboratory—Performance on secondary instruments in a heterogeneous setting. Required for those enrolled in McE 101 but may be taken separately. Instrumental majors must attend Instrumental Laboratory for two of the three fall semesters following their freshman year. Open to sophomore, junior and senior music education majors. Offered every fall. Lab 1, Cr 1.

Courses in Performance Techniques (Mc P)

5/6. Piano Class—Designed to give a basic command of the keyboard. Recommended especially for students preparing to take the proficiency examination in secondary piano. May be taken as an introduction to piano performance for the beginning student. Prerequisite: Music majors only. Lab 2, Cr 1.

15/16. Piano Class—A continuation of P 5/6 designed to complete the proficiency examination in secondary piano. Prerequisite: McP 5/6, or permission of the instructor. Music majors only. Lab 2, Cr 1.

40. Basic Conducting—Conducting techniques; emphasis on practical application to vocal and instrumental groups. Cr 2.

41. Choral Conducting and Literature—Basic choral conducting and study of problems in the organization and training of choral groups. Prerequisite: Mc P40. Cr 3.

45. Band Conducting and Literature—Basic instrumental conducting, and study of problems in the organization and training of bands and orchestras. Prerequisite: Mc P40, Cr 3.

51.52. Accompanying—Fulfilled through accompanying students in lessons and recital or as accompanist for major performing organization. Lab 2, Cr 1.

101/102. Performance Studies—Applied study in piano, voice, organ, stringed instruments, and orchestral instruments at the advanced level. Intensive study of performance techniques and concentration on repertoire and preparation of material which shall be of such advancement technically and interpretatively as to compare favorably with a professional recital program. May be repeated for credit. Prerequisite: Mc 80 or equivalent. Cr 2.

105/106. Keyboard Musicianship—A comprehensive application of the study of harmony to the keyboard, directed towards the development of sight-reading and accompanying skills, keyboard score-reading, transposition, harmonization at sight, improvisation and the realization of figured bass or other chording schemes. Prerequisite: Mc T 14, Mc P 6 or equivalent level, including completion of Piano Proficiency requirements. Cr 2.

111/112. Advanced Chamber Music—The study and performance of the standard ensemble literature for string instruments, wind instruments, and piano. Cr 2.

Courses in Music History (McH)

1/2. History of Western Music—The history of music from antiquity to the present day with a technical study of the significant musical trends. Prerequisite: For the major, Mc L 22, or sophomore standing. For the general student, permission of the instructor. Cr 3.

217. Music of the Baroque Period—A study of music in the 17th and first half of the 18th centuries; from Monteverdi and Schutz to Bach and Handel. Prerequisite: Mc H 2, or permission of the instructor. Cr 3.

219. Music of the Classical Period—The changing style in form and content as evolved by Haydn, Mozart and Beethoven viewed against the background of social and political conditions of the time. Prerequisite: Mc H 2, or permission of the instructor. Cr 3.

221. Music of the Romantic Period—Study of musical expression during the 19th century with emphasis on the intellectual foundations of the romantic movement. Study and detailed analysis of representative works from Beethoven through Debussy. Prerequisite: Mc H 2, or permission of instructor. Cr 3.

223. Music of the Twentieth Century—Trends in contemporary music and their relationship to the cultural and political life of our time. Prerequisite: Mc H 2, or permission of the instructor. Cr 3.

Courses in Music Literature (Mc L)

1/2. The Art of Listening to Music—The nature of music, and the basic elements necessary for intelligent listening exemplified in representative works of the great composers. Cr 3.

3. Vocal Literature—A survey through discussion and performance of vocal literature from the 18th century to the present day to include classic Italian songs, German Lieder, French art songs, and contemporary American and British songs. Cr 1.

5. Woodwind Literature—A survey through discussion and performance of woodwind literature to familiarize the student with the standard repertory. Cr 1.

7. Brass Literature—A survey through discussion and performance of brass literature to familiarize the student with the standard repertory. Cr 1.

9. String Literature—A survey through discussion and performance of string literature to familiarize the student with the standard repertory to include that composed for string quartet. Cr 1.

11. Piano Literature—A survey through performance and discussion of standard literature for piano. Cr 1.

13. Organ Literature—A survey through discussion and performance of standard literature for organ. Cr 1.

21/22. Survey of Music Literature—A comparative study of styles, characteristics, forms, and performing mediums of music from the Renaissance to the present. Primarily for music majors. Cr 2.

Courses in Music Theory (Mc T)

1. Fundamentals of Music—An elemental study of the dimensions and basic characteristics of musical sounds, with primary emphasis upon the development of skills and concepts through creating, performing and analyzation. For the general student. Cr 3.

11A/12A. Elementary Harmony—Diatonic chordal relationships through written work, analysis, and keyboard application. To be taken concurrently with Mc T 11B/12B. Primarily for music majors. Cr 3.

11B/12B. Elementary Sight Singing and Ear Training.—Sight singing, ear training, dictation. To be taken concurrently with Mc T 11A/12A. Lab 2, Cr 1.

13A/14A. Advanced Harmony—A continuation of Mc T 11A/12A. Chromatic chordal relationships and 20th century harmonic practice. To be taken concurrently with Mc T 13B/14B. Prerequisite: Mc T 12A. Cr 3.

13B/14B. Advanced Sight Singing and Ear Training—A continuation of Mc T 11B; 12B. To be taken concurrently with Mc T 13A/14A. Lab 2, Cr 1.

121. Modal Counterpoint—Contrapuntal techniques as practiced by composers of the 16th and 17th centuries. Written exercises and analysis. Prerequisite: Mc T 12A, or permission of instructor. Cr 2.

122. Tonal Counterpoint—Contrapuntal techniques as practiced by composers of the 18th and 19th centuries. Written exercises and analysis. Prerequisite: Mc T 12A. Cr 2.

152/153. Analytical Orchestration—The practical application of harmonic and structural analysis of musical forms as concerned with orchestral and band instrumentation and reductions. Prerequisite: Mc T 14A. Cr 3.

155/156. Canon and Fugue—Analysis of masterpieces in forms, with particular concentration on the canons and fugues of Bach. Composition projects in these polyphonic types. Prerequisite: Mc T 14B, and Mc T 122, or its equivalent. Cr 2.

161. Composition I (Small Forms)—Creative writing in the smaller forms including harmonic textures and use of contrapuntal devices. Prerequisite: a working knowledge of harmony and counterpoint and permission of the instructor. May be repeated for credit. Cr 2.

163. Composition II (Large Forms)—Continuation of Mc T 161. Creative writing for voice and instruments in the large forms. Prerequisite: Mc T 161. May be repeated for credit. Cr 2.

Graduate Courses (Mc)

210. Special Topics in Music—Cr 1-3.

230/231. Advanced Choral Conducting and Literature—Cr 3.

240. Wind Literature and Conducting—Cr 3.

250. Master Course in Conducting—Cr 3.

290. Musical Perception—Cr 3.

300. Introduction to Graduate Study in Music—Cr 3.

310. Vocal Performance—Cr 2.

311. Keyboard Performance—Cr 2.

312. String Instrument Performance—Cr 2.

313. Wind Instrument and Percussion Performance—Cr 2.

398. Special Studies in Music—Cr 3.

L350/351. History and Literature of Chamber Music—Cr 2.

T 301. Theoretical Studies—Cr 3.

DEPARTMENT OF THEATRE (Th)/DANCE (Da)

Professors Bost (Acting Chairman), Colbath; Associate Professors Cyrus and Wilkinson; Assistant Professor Farrell; Instructor Jorkanowski (Da); Technical Director Wilder

The major in theatre leads to the B.A. degree in Theatre. Specific requirements for the program are available at the office of the Theatre Department (Stevens Hall).

All majors are expected to take advantage of the laboratory opportunities offered by the major production and studio production programs of the Maine Masque Theatre.

The Theatre/Dance Department, School of Performing Arts, offers courses for graduate credit leading to the Master of Arts degree. Students may apply for Thesis (including Creative Thesis), or Non-Thesis routes. Further details may be found in the Graduate School Catalog.

Courses in Theatre (Th)

The Theatre program presents five to six major productions each year, in addition to other laboratory or studio programs that are undertaken in two theatres:—(1) a 600-seat proscenium arch thrust/stage theatre, (2) a 150-seat 3/4 round theatre. The theatres serve as practical training facilities for the student. All students in the University are eligible to read for plays to be produced and may participate in the other areas of the threatre as well.

11. Introduction to Theatre—The nature of the theatre medium, its basic elements and techniques. Emphasis on the principles that underlie theatre practice and the process by which plays are translated into theatrical expression. For the general student as well as prospective theatre majors. Cr 3.

12.13. Masterpieces of World Drama—World drama as literature and as theatre. Stress on dramatic form and content, and on the uniqueness of the drama to reflect the philosophical, social, and political environment. Fall semester: Greek drama through 16th century Tudor. Spring semester: French, Spanish, Italian, and English drama, 16th through 19th century. Cr 3.

14. Stagecraft (Technical Theatre Practice)—Introduction to practice in the practical aspects of technical theatre: scenery construction and painting, properties, lighting and sound. Emphasis on procedures and technique. Shop hours required in addition to lectures and readings. Cr 3. (Will not satisfy the Arts and Sciences Humanities requirement.)

15. Stagecraft (Design Procedures)—Introduction to scenic and lighting design, technical drawing, techniques of theatre practice. Emphasis on the practical aspects of scenic and lighting design. Shop work, design projects, readings and lectures. Prerequisite: Th 14 or permission. Cr 3 (Will not satisfy the Arts and Sciences Humanities requirement.)

16. Play Production—The responsibilities of the director and to the basic principles of stage directing, including choosing and analyzing plays, scheduling rehearsals, blocking action, and determining stage business. Backstage work on major and laboratory theatre production is recommended. Lec 2, Lab 2, Cr 3.

17. Fundamentals of Acting—The basic skills of acting, including the actor's internal preparation for playing a role and the developing of his external techniques for projecting the role to an audience. Lec 2, Lab 2, Cr 3.

18. Stage Makeup—Study of principles and techniques of stage makeup. Practical application in class and production. Cr 3. (Will not fulfill the Arts and Sciences Humanities requirement.)

65. Costume I—Apparel survey from ancient Egypt to 1930, with accompanying design projects. Cr 3.

68. Theatre Practicum—Supervised experience in the Theatre Division productions in such areas as: acting, stage managing, publicity, scenery, lighting, and costumes. Prerequisite: six hours of theatre courses and permission of director of the Theatre Division. May be repeated for a maximum of nine hours. Cr 3.

100. Voice and Speech for the Actor—A studio course in the principles and development of the actor's voice and speech. Cr 3 (Alternate years)

161.162. Theatre History—The development of the drama, physical theatre, and modes of production. Fall semester: Greek theatre through the Renaissance. Spring semester: Restoration to the present day. Limited to juniors and seniors. Cr 3.

163. Scene Designing—Principles, methods, and materials used in scene designing. Laboratory projects in preparing the complete design for a particular production, including drawings and plans. Prerequisite: Th 14. Cr 3.

164. Stage Lighting—Principles, methods, and materials used in stage lighting, including their artistic and technical applications. Projects include problems in lighting particular productions. Prerequisite: Th 14. Cr 3.

165. Costume Construction—Principles of drafting, draping and period costume construction for threatre. Cr 3.

166. Stage Directing—The translation of all aspects of the theatre production into an artistic unity. Emphasis on theatre aesthetics. Practice in the directing of short plays, with particular attention to the director's work with the actor. Prerequisite: Th 16. Limited to juniors and seniors. Lec 2, Lab 2, Cr 3.

167. Advanced Acting—Development of the individual actor's versatility, with emphasis on the actor's exploration of himself as an instrument. Practice in broadening basic acting skills, role interpretation, and characterization. Limited to juniors and seniors. Prerequisite: Th 17. Lec 2, Lab 2, Cr 3.

168. Theatre Management—Principles and practices in selecting and selling a season, in running the box office, in budgeting, in graphic arts production, in advertising and publicity in the media, in audience development and public relations. Prerequisite: Th 11 and Permission. Cr 3 (Alternate years)

Graduate Courses in Theatre

260. Production of Pre-Modern Drama—Cr 3.

261. Production of Modern Drama—Cr 3.

263. American Theatre—Cr 3.

264. Asian Theatre—Cr 3.

265. Dramatic Theory—Cr 3.

266. The Literature of Directing—Cr 3.

267. Drama Colloquium—Cr 3.

268. Field Service in Theatre Production—Cr 3.

274. Aesthetics of Modern Scene Design—Cr 3.

277. The Literature of Acting—Cr 3.

301. Seminar in Research Methods—Cr 3.

367. Special Studies in Theatre—Cr 3.

369. Theatre Laboratory—Cr 3.

390.391. Directed Research—Cr 1-3.

399. Graduate Thesis—Cr Ar.

Courses in Dance (Da)

The Dance program of the School of Performing Arts provides a sound foundation for the student interested in a thorough technique for teaching or for the student interested in pursuing dance as a profession.

The many aspects of dance taught—ballet, jazz, flamenco (dances of Spain) and modern, both at beginner and intermediate-advanced levels—prepare the student for a better understanding of dance and its technique.

Repertory classes, rehearsals, and performances offer the student a thorough comprehension of professional dance and theatre. Many dance residencies are presented by renowned companies visiting our campus which offer the student performances and master classes.

The Dance Film Festival, sponsored by the Dance program, serves to expand the student's awareness of the great dancers of the past and present.

1. Beginning Flamenco—Developing fundamentals of movement as a basis for various aspects of dance, the building of energy, strength, control, rhythmic awareness, coordination, taught via Flamenco dancing, an art form of tremendous excitement, thus allowing the beginner student a continued and growing uplifting experience while learning the basics needed for dance, the appropriate focal points for a dancer, and a solid basic technique of freedom of movement. Cr 1.

2. Intermediate Flamenco—Having acquired a solid, firm technique, the student fully develops this technique and works on a professional level, performance level, and may decide to entertain a professional career, teach, or simply enjoy the stimulation of this cultural experience. Student has the option of participating in dance presentation rehearsals. May be repeated for credit. Prerequisite: Da 1 or permission. Cr 1.

3. Beginning Modern Dance Techniques—Training in fundamental movements of the modern dance technique, with an emphasis on its relationship to space, time, physical effort and shape. For the general student at the beginning dance level. Cr 1.

4. Intermediate Modern Dance Techniques—Continuation of techniques in Da 3, with an emphasis on solving more complex movement problems for each student, within the context of his or her relationship to space, time, shape and control. For the experienced dancer with a good working vocabulary in the modern dance form. May be repeated for credit. Prerequisite: Da 3 or permission of instructor. Cr 1.

5. Beginning Ballet—An introduction to classical dance training. Traditional exercises at the barre and on center floor emphasize body placement, flow of energy, and the creation of expressive movement in space. As a tool for the performing artist or general student, technique is geared to finding the physical freedom made possible within the discipline. Cr 1.

6. Intermediate Ballet—A detailed study of ballet form for the student with some previous training. Steadily mastering the execution of exercises and steps with speed, clarity and grace brings a fuller kinesthetic awareness that can be used as a base for professional training or general artistic enrichment. May be repeated for credit. Prerequisite: Da 5 or permission. Cr 1.

7. Advanced Ballet—The fine tuning of a classical dancer's form and technique. Emphasis, within the advanced movements and combinations, will be to find a strength of control and the projection of performance 'presence.' For the serious student. May be repeated for credit. Prerequisite: Da 6 or permission. Cr 1.

8. Beginning Jazz Fundamentals—Discipline and coordination of body movement in conjunction with rhythmic beats and music, preparing the student for an awareness of freedom of expressive movement. This style of dance generates from the vital rhythms and primitive textures of jazz music, whether seen as Broadway theatre dance or the imaginative understanding of ethnic explorations. Cr 1.

9. Intermediate Jazz—With acquired discipline, dance technique, and rhythmic adaptation, the student can now explore and develop musical themes in conjunction with the command and knowledge of body movement, and exercise total free expression of technique combined with motion. The student has the option of participating in dance presentation rehearsals. Prerequisite: Da 8, prior training in jazz, modern or ballet, or permission. Cr 1.

12. Dance Workshop—Cr 1.

OCEANOGRAPHY

Associate Professor Watling (Acting Chairman); Professors Dean, Dearborn, DeWitt, Green, Norton, Schnitker; Associate Professors Fink, Hidu, McAlice, Vadas; Assistant Professor Mayer; Lecturers Graham, Kennett, Mague, Mazurkiewicz, Morris, Packard, Rhoads

Oceanography is an interdisciplinary area of science concerned with studying the air-sea interface, the bottom and margins of the sea, the sea water itself, the inhabitants of the sea, and the interactions among these different subjects. Because oceanography is not a single science but, rather, a combination of sciences, training in oceanography is usually begun at the graduate level, after a student has obtained a degree in one or more basic sciences. Students wishing to prepare for graduate work in oceanography should take at least a year each of physics (Ps 1a/2a), chemistry (Ch 13/14), geology (gy 1/2) and biology (Bio 1/Bt 2 or Zo 4), and mathematics through calculus (Ms 28). An understanding of statistics and computer sciences will be helpful as will additional work in any of the above subject areas.

The Department is located in Aubert Hall on the Orono campus. In addition, the research facilities of the Darling Center (100 miles south on the Damariscotta River estuary) are utilized by the faculty and students for appropriate projects. Many of the beginning graduate courses are available to interested and prepared undergraduate students.

Persons trained in oceanography may find careers in business, education, industry, federal and state agencies, and research institutions as biological, chemical, geological or physical oceanographers.

Courses in Oceanography (Oc)

IDL 112. Maine Mariculture—The history, current advances and status of world commercial techniques of a variety of marine animals, especially mollusks and finfish. Laboratories in aquaculture methods and field trips to commercial aquaculture sites in Maine. Prerequisite: Zo 153 or permission of instructor. Cr 3.

150. Oceanography Today—An introduction to current areas of research in the ocean, with emphasis on Maine's problems. Rec 3, Cr 3.

IDL 170. (Oc, Zo) Introduction to Oceanography—Basic concepts in physical, geological, chemical, and biological oceanography for science majors. Prerequisite: permission. Cr 3.

IDL 175. (Bt,En,Fy,Oc,Zo) Field Studies in Ecology—A field trip of one to several weeks to an area of ecologic interest; complete information announced in time for registration each year the course is offered. Trips may be scheduled during holidays. This is an intensive ecology field course; field and living conditions may be primitive. Prerequisite: a course in ecology. Other preparation or recommended prerequisites will be announced for each trip. Credit will vary with the trip.

GRADUATE STUDY IN OCEANOGRAPHY

The department offers programs leading to M.S. and Ph.D. degrees. A reading proficiency in one (M.S.) or two (Ph.D.) foreign languages, ordinarily selected from French, German, Russian or Spanish, is required. Other requirements are set forth in the Graduate School Catalog.

Specific fields of research include planktology, benthic and polar ecology, aquaculture, marine fishes, phycology, pollution, micropaleontology, paleomagnetics, tectonics, petrology, coastal processes and benthic biogeochemistry.

Graduate Courses in Oceanography

IDL 201. (Oc, Zo) Biological Oceanography—The study of marine organisms and their interrelationships with the chemical, geological, and physical aspects of their environment. Prerequisite: a year of general biology and permission of instructor. Lec 3, Cr 3.

IDL 208. (Oc, Zo) Anatomy and Classification of Fishes—An introduction to the classification of fishes, including fossil forms, and a discussion of those aspects of fish anatomy of most value in systematics. Prerequisite: Zo 133 and/or 136 or permission of instructor. Lec and Lab. Cr 5.

IDL 209. Molluscan Fisheries Biology—The biology, ecology, and management of commercial marine mollusks. Course will emphasize species presently important to Maine and those having a high potential in mariculture. Lec 3 Lab 1 Cr 4. Prerequisite: IDL 201 or equivalent.

IDL 210 (Oc, Zo) Marine Invertebrate Zoology—Systematics, adaptive-functional anatomy, and life histories of free-living marine invertebrates, excluding protozoans; laboratory emphasis on studies of living material from the local fauna. Numerous field trips required. Prerequisite: Zo 153 or equivalent. Lec 2, Lab 6, Cr 5.

IDL 211. (Oc, Zo) Larval Biology of Marine Invertebrates—Life histories of free-living marine invertebrates, excluding protozoans; emphasis on development, behavior, and ecology of larval forms. Laboratory studies stress methods of procuring, handling, and culturing larvae for descriptive or experimental purposes. Numerous field trips required. Prerequisite: Zo 153 or equivalent. Rec 2, Lab 6, Cr 5.

215. Taxonomy and Morphology of Crustacea—A comprehensive review of crustacean taxonomy and morphology, including freshwater and marine, living and fossil forms. Emphasis on evolutionary history of the group. Laboratory study will emphasize local forms. Some field trips required. Prerequisite: Zo 153, IDL 210, or equivalent. Lec 3, Lab 3, Cr 4.

216. Marine Phytoplankton—Biology and ecology of marine phytoplankton, particularly of the Gulf of Maine, emphasizing quantitative aspects of growth, production, and distribution in space and time. Prerequisite: Ms 26, IDL 201, or equivalent. Lec 3, Lab 2, Cr 4.

218. Marine Zooplankton—Biology and ecology of marine zooplankton, particularly of the Gulf of Maine, emphasizing population dynamics, distributions and trophic relationships. Prerequisite: Ms 26, IDL 201, or equivalent. Lec 3, Lab 2, Cr 4.

220. Chemical Oceanography—The composition of sea water and processes influencing the distribution of chemical species over the world's oceans through geological time; the routes and rates of material transfer between the ocean, the atmosphere, sediments and the biosphere. Prerequisite: Ms 28, Ps 1/2, plus a course in physical chemistry or chemical thermodynamics such as Ch 169, Gy 157, or equivalent. Rec 3, Cr 3.

225. Marine Biogeochemistry—Biogeochemistry and benthic-pelagic coupling of nutrients, organic substances, and trace elements in the marine system. Emphasis on coastal and sedimentary regimes. Prerequisite: Oc 220 or permission of instructor. Cr 2.

241. Physical Oceanography—Physical properties of sea water; waves and tides; distribution of variables, dynamics, water masses and the general circulation. Prerequisite: Ps 1/2, Ms 26. Rec 3, Cr 3.

IDL 260. (Oc,Gy) Marine Geology—Current theories dealing with the origin of the earth as a planet and the development of continents and ocean basins. Morphology and structure of the sea floor. Interpretation of geological and geophysical evidence relevant to the origin and evolution of major tectonic features of ocean regions. Prerequisite: Gy 1/2 and permission of instructor. Rec 3, Cr 3.

IDL 263. (Bt,Oc,Zo) Marine Benthic Ecology—Ecological studies on benthic intertidal and subtidal marine organisms. Discussions on limited factors, distributions, zonation, biotic interactions, food webs, succession, productivity energy, community structure and species diversity. Prerequisite: a course in ecology. Lec 2, Rec 1, Cr 3.

IDL 264. (Oc,Gy) Structure and Tectonics of the Sea Floor—Sea floor crustal structure. The theory and application of geophysical methods employed in studies of the lithosphere. Evaluation of tectonic theories related to origin and evolution of the ocean basins and the development of their major structural features. Prerequisite: Gy 116 and IDL 260 and permission of the instructor. Rec 3, Cr 3.

IDL 266. (Oc, Gy) Micropaleontology—Study of the major groups of microfossils, their biology, morphology, taxonomy; their use in ecologic and stratigraphic interpretation. Prerequisite: Gy 114 or Zo 153 plus Gy 1/2. Rec 3, Lab 2, Cr 4.

IDL 267. (Oc,Gy) Actuopaleontology—Organisms and their relationship to their sedimentary environment. Manifestation of life documented in marine sediments, and of biotopes of sea animals in nearshore marine environments. Course conducted in form of four full weekend field investigations starting from the Ira C. Darling Center at Walpole. Prerequisite: Gy 1/2; Gy 114 or Zo 153. Cr 2.

IDL 268. (Oc,Gy) Deep Sea Stratigraphy and Paleoceanography—The study of geologic history of the ocean basins, the oceanic circulation and the climate of the past as recorded in deep sea sediments. Prerequisite: Gy 1/2 and permission. Courses in general biology and oceanography are strongly recommended. Cr 3.

391. Oceanographic Seminar—Rec 1, Cr 1.

393/394. Problems in Oceanography—Cr Ar.

399. Graduate Thesis—Cr Ar.

PHILOSOPHY (Pl)

Professors Hjelm, Skorpen, Tredwell, White; Associate Professor Allen (Chairman); Assistant Professor Rouse; Assistant Professor James Campbell (1980-81).

Philosophy is rigorous reflection on human nature, culture, and the world. It is analytic in clarifying the concepts and methods particular to the humanities and to the sciences. It is synthetic in interpreting the descriptive and evaluative findings of all branches of human inquiry, including its own.

The Humanities Requirement

Any course taken in Philosophy may be used toward fulfilling the Arts and Sciences Humanities Requirement. Pl 1, History and Problem of Self-understanding in Philosophy; Pl 2, Philosophy and Modern Life and other philosophy courses open without prerequisite are Pl 3, Methods of Reasoning; Pl 4, Problems of Philosophy; Pl 5, Introduction to Religious Studies; Pl 6, Social Issues in Recent Religious and Philosophical Thought; Pl 99, Philosophy of Education; Pl 101, History of Greek and Roman Philosophy; Pl 102, Medieval Philosophy; Pl 103, History of Modern Philosophy; Pl 111, Ethics; Pl 122, Political Philosophy; Pl 124, Introduction to Marxist Philosophy; Pl 131, Logic I; Pl 141, Philosophy of Natural Science; Pl 153, Philosophy of History; Pl 160, Introduction to Biblical Thought; Pl 161, The New Testament and Early Christianity; Pl 164, Religions and Philosophies of the East: Hinduism; Pl 165, Religions and Philosophies of the East: Buddhism; and Pl 167, Religion in America. Other courses in the department carry prerequisites — usually, satisfactory completion of one 100-level philosophy course.

The Philosophy Major

Philosophy majors complete a minimum of 27 hours in philosophy. Majors are encouraged to develop their own programs of study in philosophy in consultation with department advisers. Double-majors, e.g. philosophy with history, political science, psychology, or journalism, may also be pursued.

Elementary Courses

1. History and Problem of Self-understanding in Philosophy—From Lorenz to Plato to Kant and others, the history of humankind's progress in self-understanding is explored for relevance to individual self-knowledge today. Lectures are supplemented by film presentations such as Clark's "Civilization." Cr 3.

2. Philosophy and Modern Life—Contemporary works such as Cohen's "ESP, Science or Delusion?" Skinner's *Walden Two*, Szasz's "What is Mental Illness?" comment on issues which have concerned philosophers for centuries. This course brings together such contemporary statements and traditional philosophic texts on problems of existence, knowledge, and conduct. Cr 3.

3. Methods of Reasoning—Principles used to distinguish correct from incorrect reasoning. Topics include: the nature of thought, uses of language, recognition of arguments, informal fallacies, purposes and types of definition, deduction and induction. Understanding and mastering (through practice including computer assisted instruction) some fundamental techniques for testing the soundness of many different kinds of reasoning—including the student's own. Cr 3.

4. Problems of Philosophy—An introduction to modern philosophy. Seven topics are considered: the existence of God, the nature of man, morality, political philosophy, history and historical thinking, art and feeling, the nature of knowledge. Readings from primary sources by Kant, Mill, James, Tolstoy, Marx and Sartre, among others. Cr 3.

5. Introduction to Religious Studies—Religion as an expression of human culture, both past and present. Institutional and non-institutional manifestations of religion as conveyed through myth and symbol, religious experience, struggle for societal change, mysticism, and quests for the articulation of human values. Inquiry by various disciplines will be considered, e.g., psychology, sociology, history, philosophy, and theology. Cr 3.

6. Social Issues in Recent Religious and Philosophical Thought—An examination of various philosophical and religious treatments of the most relevant social issues of our time. This course considers analyses of such issues as sexism, racism, imperialism, violence and non-violence, integration and separatism, capitalism and socialism. Cr 3.

History of Philosophy

101. History of Greek and Roman Philosophy—Hellenic philosophy with emphasis on Plato and Aristotle, and including Presocratic philosophy, Platonism, Aristotelianism, Stoicism, Epicureanism, and Neo-Platonism. Cr 3.

102. Medieval Philosophy—A study of the principle developments of Western thought beginning with the Hellenistic era. Analysis is made of Neo-Platonism, Augustine, Medieval

scholasticism, the Thomist synthesis and its aftermath. Prerequisite: one course in philosophy or instructor's consent. Cr 3.

103. History of Modern Philosophy—An interpretation of modern philosophy beginning with Bacon and Descartes at the start of the 17th century, developing through rationalism and empiricism during the 18th, and culminating in the systems of Kant and Hegel early in the 19th. Cr 3.

104. Nineteenth Century Philosophy—A critical study of the major thinkers of the nineteenth century. Particular attention will be directed to Hegel, Feuerbach, Marx, and Nietzsche. Kant, Kierkegaard, and Dilthey will also be considered. Prerequisite: one course in philosophy (Pl 103 recommended). Cr 3.

105. Recent Philosophy—British philosophy since the turn of the century. The course considers Russell, Moore, Austin, Ryle and Wittgenstein as well as more recent writers. Prerequisite: Pl 103. Cr 3.

107. American Philosophy—A brief examination of colonial and early 19th century American contributions to the development of present-day philosophy. Particular emphasis given to the philosophical views of Royce, Peirce, James, Dewey and Santayana. Prerequisite: one course in philosophy. Cr 3.

121. Existentialism—A critical study of the philosophical significance of individual choices and actions, involving questions of personal identity, responsibility and authenticity, and the possibility or desirability of "distinterested objectivity." Authors read include Kierkegaard, Nietzsche, and Heidegger. Prerequisite: one course in philosophy. Cr 3.

128. Philosophical Classics—An intensive study of the works of a major philosopher or school. This course is conducted in seminar format. May be repeated for credit when different philosophers or problems are studied. Cr 3.

Ethics, Social, and Political Philosophy

111. Ethics—Readings and discussions of works by Mill, Kant, Nietzsche, Tillich, Dewey, and some other systematic moral philosopher. In each case, the nature of the system, its *summum bonum* and defense, will be examined, criticized, and tested for its applicability to personal and public ethical predicaments. Cr 3.

122 Philosophical Foundations of Social and Political Institutions—A critical study of the development of social and political philosophy from Plato through Hegel and Marx in light of their ethical and metaphysical systems. Topics discussed include the meaning of justice, the nature of the state, other social institutions, and the individual. The primary focus will be on normative rather than descriptive theory Cr 3.

123. Philosophy of Law—An introduction to legal philosophy. Topics include the nature of law, the limits of law, punishment, dispute settling and justice, the nature of legal reasoning. Emphasis is on contemporary legal philosophy; authors studied include Rawls, Hart, Mill, Dworkin, Raz, and Feinberg, among others. Cr 3.

124. Introduction to Marxist Philosophy: From Marx to Mao—Emphasis on Marxist political philosophy, with considerable time devoted to Marxist theory of knowledge, ethics, and social philosophy. Major focus is on the philosophy of Karl Marx, with considerable readings from F. Engels, V. I. Lenin, and Mao Zedong. Cr 3.

153. Philosophy of History—A critical study of historical knowledge and its significance. Topics include the nature of historical facts, what counts as historical explanation, whether "objectivity" is possible in history, and whether there is progress in history. Idealist, empiricist, Marxist, and phenomenological approaches will be considered. Cr 3.

Formal Logic and Philosophy of Science

131. Logic I—An introductory course in modern symbolic logic. Techniques of deductive inference, including decision procedures and axiomatization, are studied in developing the propositional and predicative logics. Some attention given to metalogic and the philosophy of logic. Cr 3.

132 Logic II—Advanced topics in symbolic logic. Prerequisite: Pl 131 or permission of instructor.

141. Philosophy of Natural Science—A critical study of scientific knowledge and how it is developed. Relations between theory and experiment, the scientist and the scientific community, and contemporary science and its historical background, will receive particular attention. The last part of the course is reserved for a discussion of science and public policy. Cr 3.

142. Philosophy of Behavioral Science—A critical examination of the conceptual foundations of modern behavioral science from behavioristic, ordinary language, and phenomenological standpoints. Reinforcement vs. role-rule appeals and model-construction vs. lawful regularities among issues discussed. Prerequisite: 6 hours philosophy, behavioral science, or instructor's consent. Cr 3.

Topics in Philosophy

50. Philosophy of Language—A study of major contemporary theories of language. Topics include the nature of meaning, uses of language, conventions in language, the nature of grammar, syntax, and semantics. Philosophers studied include Searle, Quine and Chomsky, among others. Cr 3.

99. Philosophy of Education—Consideration of major thinkers from Plato, Vico, Rousseau to Dewey and Whitehead. Discussion of great educational objectives from human excellence and autonomous reason to self-actualization and cultivated imagination of relevance to educational practices today. Cr 3.

113. Aesthetics—Investigation of the nature and importance of aesthetic experience and its objects, of the possibility of standards of art and taste, and the relation of art to other areas of experience. Topics considered include art and morality, art and science, art and the environment. Readings from primary sources by Tolstoy, Hume, Dewey, Langer, Bell, Danto, Dickie and Beardsley, among others. Cr 3.

154. Theory of Knowledge—The first half of this course is devoted to examination of recent philosophical studies in epistemology. In the last half of the course students will apply the methods of modern philosophical analysis to some theory outside philosophy, e.g., a theory in psychology, literature, biology or history. The usefulness of philosophies of sensation, belief, truth, meaning, memory and imagination for theory construction of all sorts should be clear to all members of the course by the time the semester ends. Cr 3.

155. Metaphysics—Traditional and contemporary views on the nature of reality. Historical treatment of representative metaphysicians of the past forms the basis for an examination of the categories and tenets of present-day metaphysics. Prerequisite: one course in philosophy or permission of instructor. Cr 3.

159. Topics in Philosophy—Individual and small group study of problems or systems of philosophical concern. Course conducted in seminar style and, relying on careful use of major philosophical resources, attempts fresh exploration of fundamental topics. May be repeated for credit when different philosophers or problems are studied. Prerequisite: variable. Cr 3.

199. Readings in Philosophy—Individual study of a selected topic, agreed upon by the student and the instructor. This offering is designed to address advanced issues not covered in normal offerings. Prerequisite: 9 hours and permission of department and instructor. Cr 1-3.

CONCENTRATION IN RELIGIOUS STUDIES

The concentration in religious studies is designed to provide students with the intellectual tools and scholarly background required for a critical understanding of the forms and traditions of religion that have appeared in human culture.

Pl 5, Introduction to Religious Studies, is the recommended introductory course for this field.

156. Philosophy of Religion—A philosophical study of religion, with emphasis on such topics as revelation and reason, religious language and the Divine existence as they have been dealt with in classical and contemporary thought. Prerequisite: one course in philosophy or permission of instructor. Cr 3.

157. The Nature of Religious Experience—A study of different methodological approaches to religious experience. Primary emphasis on the phenomenology of religion. A major concern is a description of religious phenomena and an interpretation of their meaning by analyzing the nature of religious symbolism. Prerequisite: one course in philosophy or permission of instructor. Cr 3.

160. Introduction to Biblical Thought—A critical examination of the historical, literary and theological development of the Biblical tradition from the time of its Hebraic origins to that of Jesus of Nazareth. Cr 3.

161. The New Testament and Early Christianity—An examination of the major ingredients of the New Testament corpus in their religious, social, and philosophical context, and a historical-theological analysis of the cult of Christ from the second century to the fifth century conciliar debates. Special attention is given to primary theological texts. Cr 3.

162. Religious Thought from the Reformation to the Enlightenment—An analysis of major theological developments from the sixteenth to the eighteenth century with special attention to Luther, Calvin, Erasmus, Pascal, and Hume. Prerequisite: one course in philosophy or instructor's consent. Cr 3.

163. Recent Religious Thought—Developments in Western theology from World War I to the present: Buber, Reinhold Niebuhr, Tillich, Bonhoeffer, and Teihard de Chardin as they bear on current philosophical theology, religious perspectives, and modern understandings of humanity and society. Prerequisite: one course in Religious Thought or Sy 182. Cr 3.

164. Religions and Philosophies of the East: Hinduism—The religious and philosophical foundations of Hinduism. Readings include the Vedas, the Bhagavad-Gita, the Upanishads, Yoga and Vedanta. Cr 3.

165. Religions and Philosophies of the East: Buddhism—The religious and philosophical foundations of Buddhism. The emphasis is on the basic teachings of the Buddha (Four Noble Truths, Noble Eightfold Path, Dependent Origination, etc.), Buddhist ethics, Buddhist meditation, and some later religious and philosophical developments. Cr 3.

167. Religion in America—A survey of the origins and development of the major American religious traditions. Special attention is given to the theological perspectives of Edwards, Emerson, William James, H. Richard Niebuhr, as well as current influential thinkers. Cr 3.

168. Nature in Philosophy and Religion—An examination of the meaning of nature and human involvement in nature from a theological and philosophical perspective as seen in major texts from the Classical, Hellenistic, Medieval, Enlightenment, and Modern periods. Prerequisite: one course in philosophy or permission of instructor. Cr. 3.

169. Topics in Religious Studies—Small class study of a theme or fundamental problem in religious thought. The course may be repeated for credit when different topics are considered. Prerequisite: variable. Cr 3.

PHYSICS AND ASTRONOMY

Professors Morrow (Chairman), Brownstein, Camp, Carr, Clark, Csavinszky, Hooper, Krueger, Smith, Tarr; Associate Professors Harmon, Hess, Rooney, Vietti; Assistant Professors Comins, Hutchison, Kleban, Mountcastle, Unertl

The department offers major work leading to the degree of bachelor of arts in physics in the College of Arts and Sciences, and also major work leading to the degree of bachelor of science in engineering physics in the College of Engineering and Science.

The B.A. degree in physics requires a minimum of 35 credit hours in physics. These must include the following courses: Ps 1/2 or Ps 1a/2a, Ps 18, Ps 19, Ps 20, Ps 36, Ps 198a/b. In addition at least two credit hours of 100 level laboratory course work in physics are required, and a minimum of four 100 level lecture courses in physics (As 150/151, Ps 117, Ps 155, Ps 157, Ps 161, Ps 162, Ps 163, Ps 169, Ps 170, and Ps 196). In order to accommodate premedical students and others with special course requirements, one or two 100 level courses from other sciences may be substituted with the permission of the major adviser. Note, however, that a minimum of 35 hours must be elected in *physics*. Necessary mathematics courses are Ms 26, Ms 27, Ms 28 and Ms 59 or the equivalent. Finally, the student will elect six additional hours selected with the adviser's consent from physics, other sciences, engineering, or mathematics. The following courses may *not* be used to satisfy the 35 hour major requirement: Ps 3, Ps 4, Ps 6, Ps 31, and As 14. Also, either As 9 or As 15 may be used, but not both.

The faculty of the Department of Physics and Astronomy strongly recommends that all candidates for the B.A. degree in Physics complete at least one year of a foreign language at a col-

lege or university. Students preparing to attend graduate school in physics should complete the intermediate level of French, German or Russian.

The following courses of the more descriptive variety are open to all students and have no prerequisite: As 9, Ps 3, 3L, 4, 4L, 9, 10, 31.

PHYSICS AND COOPERATIVE EDUCATION

Students in good standing enrolled in the Physics curriculum who are completing their second year of undergraduate work have available the option of working for their degree within a Cooperative Education Program. Cooperative Education is the integration of practical work experience, obtained through specific periods of employment in industry, business or government, into the on-campus classroom and laboratory course curriculum. A student in the Cooperative Education program works as a paid employee in an industrial environment at a job selected by mutual agreement with the student, the employer and the cooperative education coordinator of the Department of Physics. Academic credit is received through enrollment in Ps 194, Field Experience in Physics.

Astronomy (As)

9. Introduction to Astronomy—A descriptive survey of astronomy, designed to give the student an appreciation of contemporary views of the universe. Topics include the solar system, stars, galaxies, black holes, quasars, and cosmology. No prerequisites. Lec 3, Cr 3.

14. Navigation—Piloting, dead reckoning, and celestial navigation. A working knowledge of trigonometry is required. Not given every year. Offered under CED. Cr 3.

15.16. General Astronomy—An introductory sequence in astronomy and astrophysics, the material being discussed in more detail than in As 9. Solar system astronomy (including celestial mechanics, astronomical coordinate systems, Kepler's laws, and the sun) is treated in As 15. Stars, galaxies, quasars and cosmology are treated in As 16. Not given every year. Prerequisites: Ms 27, Ps 1/2 or Ps 1a/2a, or permission. Lec 3, Cr 3.

150/151. Astrophysics—Application of the principles of physics to the study of cosmogony, stellar evolution and dynamics, interstellar processes, the formation and evolution of galaxies, and cosmology. Topics such as astronomical distance measurements, red shifts, quasars, black holes, etc., are developed. Prerequisite: Ps 36, Ps 117, Ps 155, Ms 153, or permission. Rec 3. Cr 3.

Physics (Ps)
Undergraduate Courses

1/2. General Physics—An introductory one-year, calculus-based sequence in physics primarily serving students majoring in engineering or the sciences. Ps 1 treats mechanics, acoustics, and thermodynamics; Ps 2 treats electricity, magnetism, and optics. Corequisite: Ms 26. Lec with dem. 2, Rec 1, problem workshop 1, Lab 2, Cr 4.

1a/2a. General Physics—An introduction to the fundamentals of mechanics, matter, energy, heat, sound, electricity, magnetism, light, and modern physics. Similar to Ps 1/2, but does not use calculus. Meets the needs of premedical, predental and other students of similar professional interests. A working knowledge of algebra and trigonometry is required. Lec with dem 2, Rec 1, Lab 2, Cr 4.

3. Fundamental Physics—A non-mathematical introduction to basic physical principles for the non-science student. Designed to develop an appreciation for the concepts and applications of physics. May be taken without Ps3L (below). No Prerequisites: Lec with dem 3, Cr 3.

3L. Fundamental Physics Laboratory—Laboratory exercises to accompany Ps3 Fundamental Physics, which is a corequisite. Lab 2, Cr 1.

4. Environmental Physics—A non-mathematical exploration of how physics underlies phenomena in the world around us. Central attention is given to the concept of energy, its production and use, and the concommittant effects on our environment. Topics such as electric power generation, nuclear reactors, home insulation, air and water pollution will be analyzed in terms of basic physical principles. May be taken without Ps4L (below). Prerequisite: Ps 3, or permission. Lec with dem. 3, Cr 3.

4L. Environmental Physics Laboratory—Laboratory exercises to accompany Ps4 Environmental Physics, which is a corequisite. Lab 2, Cr 1.

6. Essentials of Physics—A one-semester basic course designed primarily for students in programs not requiring as comprehensive a treatment as in Ps 1a/2a. Topics are chosen from mechanics, heat, waves, light, electricity, and magnetism. A working knowledge of algebra and trigonometry is required. Lec 3, Rec 1, Lab 2, Cr 5.

9. Climatology—An introduction to general climatology, treating the elements of climate classification and the modifications to the atmosphere resulting from human activities. An elementary scientific discussion of the problems of energy conversion and how these problems relate to environmental pollution. Not given every year. No prerequisite: Rec 3, Cr 3.

10. Meteorology—A descriptive course treating the physics involved in the weather. Topics include radiation balance, atmospheric motion, precipitation processes, circular storms, air pollution, and the polar front model. Rec 3, Cr 3.

18. Electricity and Magnetism I—An introduction to electromagnetic theory, developing the subject as far as Maxwell's equations in a vacuum. Intended to provide the foundation for Ps 155. Prerequisites: Ps 2 or 2A, Ms 27. Lec 2., Comp 2, Cr 3.

19.20. Intermediate Physics Laboratory—Ps 19 consists of experiments primarily in mechanics and modern physics. Ps 20 is primarily electrical measurements. Normally taken with Ps 36 and Ps 18 respectively. Prerequisite: Ps 2 or 2A, Ms 27. Lab 2, Cr 1.

31. Photography—Fundamental theories and techniques. For the scientist and the amateur. Characteristics and use of various types of cameras, lenses, exposure meters, emulsions, filters, artificial lighting. Copying by contact and projection printing, dark room practice. Not given every year. No Prerequisites: Rec 2, Lab 2, Cr 3.

36. Introductory Modern Physics—The basic principles of relativity, quantum theory, atomic structure, nuclear structure, and of some aspects of molecular, solid state, and elementary particle physics. Prerequisites: Ps 2 or 2A, Ms 27. Lec 2, Rec 1, Cr 3.

117. Mechanics—A more advanced treatment of Newtonian mechanics than in Ps 1. Topics may include Newton's laws, work-energy theorem, impulse-momentum theorem, particle motion in a plane, linear oscillator, coupled oscillators, rigid body rotation, small oscillations and potential methods. Prerequisites: Ps 1 or Ps 1a, Ms 59, or permission. Lec 2, Comp 2, Cr 3.

IDL 150. (Ee, Ps) Optical Communications—Major components used in optical communications, processing and storage are studied through theoretical and experimental investigation of the fundamental properties of light and its interaction with matter. Prerequisite: Ps 172. Rec 3, Cr 3

153. Electrical Measurements—A laboratory course covering theories and practices in the measurement of physical quantities using both analog and digital techniques. Primarily for physics majors; others admitted by permission. Lab 4, Cr 2.

155. Electricity and Magnetism II—An advanced treatment of the fundamental aspects of electrostatics, magnetism, and electromagnetic phenomena. Applications of Maxwell's equations. Prerequisites: Ps 18, Ms 59, or permission. Rec 3, Cr 3.

157. Biophysics—Applications of physical principles to biological systems. Topics include membrane structure and function, viscous flow, sedimentation, electrophoresis, spectroscopy, x-ray analysis, ultrasound, and bio-effects of ionizing and non-ionizing radiation. Prerequisites: Ps 2 or 2a, Ms 26, Ch 13, or permission. Rec 3, Cr 3.

161. Advanced Meteorology—Selected topics of interest in cloud microphysics, radiation processes, and how they apply to the atmosphere. Details of atmospheric motion. Not given every year. Prerequisite: Ps 2 or 2a; Corequisite: Ms 153. Rec, Cr 3.

162. Heat and Thermodynamics—The laws of thermodynamics. Thermodynamic description of the properties of matter. Normally taken as a junior or senior elective by students in the sciences or engineering. A theoretical course dealing with the structure and concepts of thermodynamics. Not given every year. Prerequisite: Ps 1 or 1a, Ms 59. Rec 3, Cr 3.

163. Statistical and Thermal Physics—The principles and methods of statistical mechanics are developed and applied to systems of current interest. The close relationship of statistical mechanics and thermodynamics is emphasized. Prerequisites: Ps 36, Ms 59. A course in thermodynamics is desirable but not required. Rec 3, Cr 3.

169. Atomic Physics—Introductory quantum mechanics applied to simple atoms and molecules. Radiation, Schrödinger theory, quantum statistics. Normally taken by senior physics majors. Prerequisites: Ps 36, Ms 153, or permission. Rec 3, Cr 3.

170. Nuclear Physics—Properties of the nucleus, nuclear reactions, radioactive decay, nuclear models, nuclear reactors. Prerequisite: Ps 36. Corequisite Ms 153, or permission. Rec 2, Lab 2, Cr 3. May be taken without the laboratory for two credits only.

172. Optics—Topics in geometrical and physical optics, the choice of which is dictated by current applications in technology; e.g., communications and information processing, instrumentation and non-destructive testing. Single surface reflection and refraction, simple lenses and lens systems, dispersion, Fraunhofer diffraction, spatial filtering, holography. Prerequisites: Ps 2 or 2a; Corequisite Ms 59. Rec 3, Cr 3.

176. Physical Measurements—Experiments selected from various branches of physics. Typical experiments may involve x-ray diffraction, microwaves, the photoelectric effect, Hall effect, etc. Normally taken by junior physics majors. Students are encouraged to develop their own procedures in performing the assigned experiments. Prerequisite: Ps 36, Ms 28.

181.182. Advanced Laboratory Physics—Selected projects for senior physics majors. Students are expected to develop original ideas and to design and construct novel apparatus under the guidance and approval of a faculty member. Open to senior physics and engineering physics majors, and other students by permission. Lab 6, Cr 3.

193. Topics in Physics—Primarily for undergraduates. Deals with selected topics in areas not already covered by regular course offerings in the department. Given on demand. Cr Ar.

194. Field Experience in Physics—Supervised research or development in an academic laboratory, government laboratory, or industrial environment. Placements are usually off-campus and of several months' duration. Prior approval of the department chairman is required. Prerequisite: completion of 16 hours of physics. Cr 1-6.

196. Physics of Materials—A senior level introductory course in the physics of materials, primarily solid state physics. Structural mechanical, electrical, magnetic, and optical properties of materials are discussed. Prerequisites: Ps 36, Ps 155, Ms 59. Rec 3, Cr 3.

198a/198b Physics Seminar—A senior level course required of all physics majors. Students are required to prepare written reports on scientific topics of their own selection. Formal talks on this material are given before an audience of classmates and faculty. Intended to develop the ability to discuss a scientific topic before a scientifically trained audience. 198a No credit, 198b Cr 1.

199. Problems in Physics—A thesis project primarily for undergraduates and ordinarily of an experimental nature. Cr (1-3).

Graduate Courses

201. Mechanics—Rec 3, Cr 3.

210. Graduate Laboratory—

212. Electrodynamics I—Rec 3, Cr 3.

218.219. Methods of Theoretical Physics—Rec 3, Cr 3.

220. Quantum Mechanics I—Rec 3, Cr 3.

230. Statistical Mechanics—Rec 3, Cr 3.

291. Special Topics in Theoretical or Experimental Physics—Cr Ar.

300. Graduate Seminar—Cr Ar.

307. Nuclear Physics—Rec 3, Cr 3.

313. Electrodynamics II—Rec 3, Cr 3.

321. Quantum Mechanics II—Rec 3, Cr 3.

324.325. Solid State Physics I and II—Rec 3, Cr 3.

399. Graduate Thesis—Cr Ar.

GRADUATE WORK IN PHYSICS

The degrees of master of science and doctor of philosophy are offered in physics. The department also offers the degree of master of science in engineering physics. See section on Graduate Study for detailed requirements. Also consult the Graduate School catalog.

SPECIMEN CURRICULA IN PHYSICS

I. The following curriculum is designed for the student who desires a strong background in physics to prepare for a career in physics or for graduate study. There are many other possible arrangements, and usually the student will design an individualized program with an advisor from the Department of Physics.

Freshman Year

	FALL SEMESTER	Credit Hours		SPRING SEMESTER	Credit Hours
Ps 1 or 1a	General Physics	4	Ps 2 or 2a	General Physics	4
Ms 26	Anal. Geom. & Cal.	4	Ms 27	Anal. Geom. and Cal.	4
	Electives**	6		Electives	9
		14			17

Sophomore Year

Ps 19	Intermediate Lab	1	Ps 18	Electricity & Mag. I	3
Ps 36	Intro. Modern Physics	3	Ps 20	Inter. Lab	1
Ms 28	Calculus	4	*Ch 14	Chemical Princ.	4
*Ch 13	Chem. Principles	4	Ms 59	Diff. Equations	4
	Electives	3		Elective	3
		15			15

Junior Year

Ps 117	Mechanics	3	Ps 155	Elect. & Mag. II	3
Ps 153	Electrical Meas.	2	Ps 172	Optics	3
Ms 153	Partial Diff. Eq.	3	Ps 176	Physical Meas.	2
	Electives	6	Ms 154	Partial Diff. Eq.	3
				Elective	3
		14			14

Senior Year

Ps 169	Atomic Physics	3	Ps 198 b	Physics Seminar	1
Ps 198 a	Physics Seminar	0	Ps ____	Physics Elective	3
Ps ____	Physics Elective	3		Electives	12
	Electives	9			
		15			16

*Taken in the Freshman, Sophomore, or Junior Year.

**The student must include among elective courses those courses needed to satisfy the basic group requirements of the College of Arts and Sciences.

A student preparing for graduate work in physics is advised to take some or all of the following electives in his Junior or Senior year; Ps 162 (Thermodynamics), Ps 163 (Statistical and Thermal Physics), Ps 196 (Physics of Materials), Ps 170 (Nuclear Physics), as well as additional math courses.

II. The following specimen curriculum is designed for those students who desire a degree in physics but who wish greater breadth in background in other areas of science—such as biological, geological, chemical or environmental sciences. The program outlined below enables a student to begin a major in physics during the Sophomore year.

Freshman Year

FALL SEMESTER	SPRING SEMESTER
**Electives, 15 hours	Electives, 15 hours

**The student must include among the elective courses those courses needed to satisfy the basic group requirements of the College of Arts and Sciences.

Sophomore Year

		Credit Hours			Credit Hours
Ps 1 or 1a	General Physics	4	Ps 2 or 2a	General Physics	4
Ms 26	Anal. Geom. & Cal.	4	Ms 27	Anal. Geom. & Cal.	4
	Electives	9		Electives	9
		17			17

Junior Year

Ps 19	Inter. Lab	1	Ps 18	Elec. & Mag. I	3
Ps 36	Intro. to Mod. Physics	3	Ps 20	Inter. Lab	1
Ms 28	Anal. Geom. and Cal.	4	Ps 172	Optics	3
	Electives	6	Ms 59	Diff. Equations	4
				Elective	3
		14			14

Senior Year

Ps 117	Mechanics	3	Ps 155	Elec. & Mag. II	3
Ps 153	Electrical Meas.	2	Ps 176	Physical Meas.	2
Ps 198a	Physics Seminar	0	Ps 198b	Physics Seminar	1
Ps ____	Physics Elective	3	Ps ____	Physics Elective	3
	Electives	6		Electives	6
		14			15

POLITICAL SCIENCE (Pol)

Professors Collins, Horan (Chairman), Mawhinney, Palmer, Schoenberger, Thomson; Associate Professors Hayes, Taylor, Wendzel; Assistant Professors Ahn, Helmke, Laverty, Sorg, Thai.

Students may major in the following fields: (1) political science, (2) international affairs, or (3) public management.

Specific requirements for majors:

1. Political Science: a minimum of 33 hours of work in the department including Pol. 1: at least six hours within three of the following six sub-areas, with at least one sub-area selected within (a) and one sub-area within (b):

(a) United States Government

(1) United States National Institutions
Pol 155; 156; 158; 159; 161; 162; 183; 184; *249; *283.284

(2) Public Administration
Pol 134; 150; 151; 152; 153; 154; 157; *200, *201; *212; *217

(3) State and Local Government
Pol 3; 7.8; 133; 134; 160; 180; 186; 193; 195; *200; *201; *250; *253; 254

(b) Foreign Governments and Theory

(1) Comparative Governments
Pol 131; 135; 136; 165; 167; 168; *217; *231; *237

(2) International Studies
Pol 21; 22; 173; 174; 177; 187; 188; 196; 199; *273; *287; Pol 123/124

(3) Political Theory
Pol 10; 12; 182; 189.190; 191; 192; 197; 199; *289; *294; *295

*Graduate courses at the 200-level may be advised for a few senior students.

In addition, a student is required to select one of the following alternatives: (a) Related Areas—General: 12 hours total from at least three related social science fields as follows: anthropology, economics, United States *or* European history, modern society, philosophy, psychology, sociology; or (b) Related Areas—Specific: the introductory course plus at least 12 hours in any one of the following fields: anthropology, economics, history, philosophy, psychology, or sociology.

2. International Affairs: see Index.

3.Public Management: a minimum of 39 credit hours, in addition to prerequisites, as described below.

The public management major is an undergraduate program designed to educate men and women about governmental service and the field of public administration, its environment, problems and opportunities. The B.A. in Public Managment is not narrowly defined as a training program for any one skill, task, or profession. However, individual program design may lead to a degree of specialization in a student's career preference. Students are urged to take advantage of the department's wide variety of internship offerings in local, state, or federal government. Since the number of internships in the field is limited, the Departmental Public Management Committee will establish a list of candidates according to such factors as university grade point average, performance in the courses of the public management program, and demonstrated interest and initiative in public management.

A. Prerequisites (for admission to the program)

1. Pol 1	American Government
2. Ec 10	Principles of Economics
3. Ms 19	Principles of Statistical Inference (or any introductory statistics course)

Of the 39 credit hour minimum described below, at least 24 credit hours should be in Political Science.

B. Skills Component (6 hours)

1. Eh 17	Advanced Professional Exposition or
Sc 45	Small Group Communication or
Sc 57	Business and Professional Speaking or
Sy 170	Small Group Analysis
2. Ba 9	Principles of Accounting I or
Ge 120	Engineering Decision-Making or
Ms 81	Computer Programming

C. Substantive Core (15 hours)

1. Pol 151	Public Administration
2. Pol 153	Administration of Public Personnel or
Pol 157	Public Organization and Management
3. Pol 154	Public Budgeting and Financial Administration or
Ec 172	State and Local Government Finance
4. Pol 133	Urban Politics or
Pol 160	Problems of State Government
5. Pol 134	Municipal Administration or
Pol 150	Introduction to Public Policy

D. Practical Component (at least one course must be chosen)

1. Pol 180	Field Experience or
2. Pol 193	State Government Internship or
3. Pol 195	Municipal Government Internship or
4. Pol 198	Practicum in Municipal Government

E. Electives within the Department (6 hours)

1. Pol 7/8	Maine Government
2. Pol 152	Administrative Law
3. *Pol 200	City and Regional Planning
4. *Pol 201	State Administration
5. *Pol 212	Electronic Data Processing
6. *Pol 250	Policy Studies
7. *Pol 253	Public Personnel Management
8. *Pol 254	Public Financial Administration
9.	or any course from Part C, which was not selected toward the "substantive core" requirement.

F. Electives Outside of the Department (9 hours)

1. Are 171	Land Resource Economics
2. Are 174	Land Use Planning
3. AtH 19	Modern Architecture and Design
4. Ba 10	Principles of Accounting II
5. Ba 151	Business Finance
6. Ce 5	Surveying

7. Ce 28	Highway Engineering Fundamentals
8. Ce 30	Transportation Engineering
9. Ce 31	Introduction to Sanitary Engineering
10. Ce 175	Contemporary Environmental Pollution
11. Ec 132	Macroeconomics
12. Ec 144	Urban Economics
13. Ec 171	Public Finance and Fiscal Policy
14. Jr 22	Survey of Mass Communications
15. Sy 24	Sociology of Rural Life
16. Sw 120	Introduction to Social Work and Social Welfare
17. Sw 140	Social Welfare Policy and Issues

*Graduate courses at the 200-level may be advised for a few senior students.

The department offers a graduate program leading to the Master of Public Administration degree.

Bureau of Public Administration

Created within the Department of Political Science by the 102nd Maine Legislature, the Bureau of Public Administration is engaged in governmental research and publication and in programs of career development over the state.

Courses in Political Science (Pol)

1. American Government—An introductory study of the major principles, structures, processes and policies of United States government. The Constitution and its development, civil liberties, federalism, the role or political parties and interest groups, and the nature of the presidency, the bureaucracy, the Congress and the national courts. Cr 3.

3. State and Local Government—The structure and functions of subnational government in the United States. Attention to legal structures, political processes, and relations among governments. Freshman and sophomores only. Cr 3.

7.8. Maine Government—Practical operations and current problems of state and local government in Maine. One lecture each week by an official, followed by a discussion period. Open to all students. Cr 1.

10. An Introduction to Politics—A study of the scientific development of political science; of such key concepts as power, influence and authority; and of the relationship of politics to such contemporary problems as racism, poverty, threats to the environment, and international conflict. Freshman and sophomores only. Cr 3.

12. Introduction to Political Ideas—An introduction to concepts and issues found in political discourse. Attention given to contemporary political ideologies, such as communism, fascism, and democracy. Cr 3.

21.22. Current World Problems—First semester: contemporary international politics, focusing on the factors that condition the choice of foreign policies by the United States and the Soviet Union; reviews, from the point of view of each, their respective policies from World War II until the present. Second semester: contemporary international political problems of the United Kingdom, France, Germany, the Middle East, China and Japan. Cr 3.

123/124. Political Geography—The geographic and demographic factors that condition national and international politics. Emphasis on the relationships of major nation-states to their areas and to the world, on examination of their strategic necessities, and on historical reviews of their resultant foreign policies. Cr 3.

131. Introduction to Comparative Politics—The nature, dimensions, and issues in the discipline of comparative politics. Emphasis on relevant theories, basic conceptual tools, analytical skills, and the processes of political development. Prerequisite: six hours of Political Science. Cr 3.

133. Urban Politics—Urban environment; political behavior of local parties and interest groups, city councils, urban executives and the bureaucracy; intergovernmental relations; governmental alternatives considered. Prerequisite: Pol 1, Cr 3.

134. Municipal Administration—The management, financial control and administration of modern American cities; emphasis on personnel and finance administration, the city plan, and

line functions: public safety, transportation, health and welfare, housing. Prerequisite: Pol 133, Cr 3.

135. Democratic Governments of Europe—The political traditions, parties, governmental structures, and special political problems of Great Britian, France and West Germany. Prerequisite: Pol 1, juniors and seniors only. Cr 3.

136. the Communist Government of the Soviet Union—The political traditions of prerevolutionary Russia, the basic principles of Marxism-Leninism, and the contemporary communist party, state, economy, and society of the Soviet Union. Prerequisite: Pol 1, junior and senior standing. Cr 3.

150. Introduction to Public Policy—An introduction to the study of the policy process. Models of policy formulation, selection, execution and impact are considered with reference to specific policy areas, such as health, welfare, defense, budgets and taxes, law enforcement, etc. Prerequisite: Pol 1, Cr 3.

15. Public Administration—The dynamics of governmental administration including administrative principles, decision-making, communication, leadership organizational models and technical, political and personal factors of administration. Prerequisite: Pol 1, Cr 3.

152. Administrative Law—Primarily case studies of the legal adjustment of administrative authority and individual liberty, including: judicial control over administration, personal liability of officers, scope and limits of administrative powers and the due process measurement of administrative procedure. Prerequisite: Pol 151, Cr 3.

153. Administration of Public Personnel—An analysis of the various functions of public personnel administration, including organization and management and the handling of personnel problems relating to public employees at all levels of government. Prerequisite: Pol 151, Cr 3.

154. Public Budgeting and Financial Administration—An analysis of the budgeting process including political aspects. The budget is considered as an instrument of fiscal policy; budget preparation and classification are discussed with special emphasis given to program and performance budgeting. Prerequisite: Pol 151, juniors and seniors only. Cr 3.

155. Congressional Internship—A first-hand study of the national legislative process and the function of the legislator. The student will be assigned to the staff of a congressman or senator in Washington, D.C., from about February 1 to the end of June. Readings and reports are required in addition to the staff work. Open to juniors and seniors on a competitive basis. Rules announced publicly each fall semester. Cr 9. Students may not recieve more than 6 credit hours for internship within the department.

156. Political Parties—Development and present organization and operation of the American party system. Nature and function of major and minor parties, sectionalism, nominating systems, presidential and congressional elections, the electorate, financial groups. Prerequisite: junior standing and Pol 1, Cr 3.

157. Public Organization and Management—Builds on the introduction to concepts of organization and management science in Pol 151. Topics may include, among others, bureaucratic politics, public organization design, organizational information and control systems, and organizational innovation. Prerequisite: Pol 151. Not open to students with credit for Ba 123, Ba 164, or Ba 168. Cr 3.

158. Public Opinion—The role of public opinion in American democracy; definition and measurement; sociological and psychological influences; mass media; linkage to government. Prerequisite: junior standing and Pol 1, Cr 3.

159. Problems of American Government—An examination of basic problems of American national government. Case studies in such areas as federalism, the nature of the presidency, congressional organization, civil rights and liberties, the role of the judiciary, and foreign affairs. Prerequisite: Pol 1. Juniors and seniors only. Cr 3.

160. Problems of State Government—An examination of basic problems of American state government. Case studies in such areas as the role of the state in the federal system, the office of the governor, lawmaking, administrative organization, the nature of judiciary, and the future of state government. Prerequisite: sophomore standing and Pol 1. Cr 3.

161. The American Legislative Process—A treatment of the legislative process in Congress and the states. Attention is given to the external environment of legislative bodies and to their

internal decision-making structures. Consideration of recent reform in legislative practices. Prerequisite: Pol 1. Cr 3.

162. Executive Leadership in American Politics—Focuses on theories of leadership and then examines political behavior of American presidents, governors, and/or local executives. Emphasis is on problems, historical changes, styles, and performances of individual political executives. Prerequisite: Pol 1. Cr 3.

165. Governments of South Asia—The governments and politics of selected countries of South and Southeast Asia. Emphasis on common problems of emergent nations of the area. Prerequisite: six hours of Political Science. Cr 3.

166. Governments of East Asia—A study of the contemporary political systems of China and Japan. Prerequisite: six hours of Political Science. Cr 3.

167. African Politics—Analysis of the transition from colonialism to independence in selected countries of Sub-Saharan Africa. Discussion of nation-building, the one-party system, military intervention in politics, and neo-colonialism. Prerequisite: six hours of Political Science. Cr 3.

168. Government in Latin America—Concentration on "political styles," the contemporary struggle between tradition and revolution, political elites, economic and political problems. Selected case studies, not necessarily the same each year. Prerequisite: six hours of Political Science. Cr 3.

173. International Relations—The international system of states; the impact of nationalism; the restraints imposed on the unilateral actions of governments; and the possibility of peace resulting from war, disarmament, functionalism, and diplomacy. Prerequisite: junior standing and six hours of History or Political Science. Cr 3.

174. U.S. Foreign Policy—The formulation and implementation of United States foreign policy. Analysis of such topics as: conceptual framework for study, structures and processes, factors shaping, alternative strategies, and problems. Prerequisite: six hours of Political Science or History. Cr 3.

175. National Security Analysis—An examination of national and international factors affecting the survival and security of international political units. Emphasis on components and use of military power, arms control, cause and resolution of conflict, negotiation, and decision-making processes and structures. Prerequisite: junior or senior standing. Cr 3.

177. Politics of the Middle East—The politics of the Middle East from World War I to the present. Special attention to problems of Palestine and the creation of Israel, the interplay between the politics of the great powers and Middle East conflicts, and problems of nationalism, modernization, and revolution. Prerequisite: junior standing or permission. Cr 3.

180. Field Experience—Enables a student to participate in a political or governmental organization. Readings and reports required in addition to meetings with faculty sponsor and/or other field experience participants. Prerequisites will be determined in each case based upon the nature of the field experience proposed. Six credit hours maximum for any single field experience registration. Majors within the department may not receive more than a total of 12 credit hours toward graduation for any combination of internships and field experience, and not more than 6 credit hours may be used toward the department major. Prerequisite: junior or senior standing.

182. Introduction to Law—The focus of the course is on the nature and functions of law in the modern world; on law as part of the study of society. Not a technical course in law. Prerequisite: junior or senior standing. Cr 3.

183.184. Constitutional Law—The political, economic and social development of the Constitution through Supreme Court decisions. First semester: cases in judicial power, the separation of powers and federalism. Second semester: decisions in civil liberties; Bill of Rights and Fourteenth Amendment. Prerequisite: Pol 1, Cr 3.

186. Local Government Law—Fundamentals of law relating to local government, viewed from the perspective of the public administrator. Prerequisite: Pol 151, Cr 3.

187. International Law—Introduction to the law that governs relations among states; includes the territory and jurisdiction of states, the law of treaties, recognition of states and governments, the law of the sea, and the law of war. Prerequisite: junior standing and six hours of History or Political Science. Cr 3.

188. International Organization—The nature, historical development, and basic principles of international organization. The structure, operations, and peacekeeping activities of the United Nations are emphasized. Prerequisite: junior standing or permission of instructor. Cr 3.

189.190. Political and Social Thought—A survey of political theories from ancient Greece to the French Revolution. The basic approach is historical, and seeks to relate theories of politics to the environments in which they develop. Prerequisite: junior standing. Cr 3.

191. American Political Ideas—The development of political ideas in America from 1620 to the present. Prerequisite: junior standing. Cr 3.

192. Modern Political and Social Thought—From the French Revolution to the present. Liberalism, utilitarianism, socialism, fascism, communism. Prerequisite: junior standing. Cr 3.

193. State Government Internship—Professional experience in a department or agency of state government. Open to selected students. Reports and readings required. Available under the Maine State Government Internship Program enacted by the 103rd Legislature. Summer Session only. Cr 6. Majors within the department may not receive more than a total of 12 credit hours toward graduation for any combination of internships and field experience, and not more than 6 credit hours may be used toward the departmental major.

195. Municipal Government Internship—Professional experience in local government. Reports and readings required. Cr 6. Majors within the department may not receive more than a total of 12 credit hours toward graduation for any combination of internships and field experiences, and not more than 6 credit hours may be used toward the departmental major.

196. International Affairs Internship—Study during the summer in a government agency, an international organization, or a business with overseas operations. Readings, reports, and on-the-job training required. Open to junior or senior International Affairs majors. Cr 3. Students may not receive more than 6 credit hours for internships within the department.

197. Scope of Political Science—The scope and nature of the study of politics; power and society; basic descriptive political theory and the role of political institutions. Prerequisite: open to senior Political Science majors or with permission. Cr 3.

198. Practicum in Municipal Government—Lectures by visiting municipal, regional, state and federal officials on a series of topics and problems which will face the public administrator in his position; supplemented by the instructor and reading assignments. Required of Public Management majors. Prerequisite: Public Management senior or permission of instructor. Cr 3.

199. Theory and Methodology of International Relations—Traditional and current theories of international politics and the application of such theories to specific situations. Emphasis on such approaches as systems analysis, game theory, decision-making, simulation, and the development of theoretical models. Prerequisite: Pol 173 or permission. Cr 3.

Graduate Courses

200. City and Regional Planning—Cr 3.

201. State Administration—Cr 3.

205. Political Man and His Milieu—Cr 3.

206. State Politics in the United States—Cr 3.

207. Local and Regional Government and Politics—Cr 3.

212. Electronic Data Processing in Public Administration—Cr 3.

217. Comparative Administrative Systems—Cr 3.

231. Topics in Comparative Politics—Cr 3.

237. The Evolution and Development of Canadian Government and Politics—Cr 3. (IDL 237 or Hy 237)

249. Seminar in Amercian Politics—Cr 3.

250. Policy Studies—Cr 3.

253. Public Personnel Management—Cr 3.

254. Public Financial Administration—Cr 3.

273. Problems in International Politics—Cr 3.

283.284. American Constitutional Development—Cr 3.

287. Problems in International Law—Cr 3.

289. Topics in the History of Political Philosophy—Cr 3.

294. Topics in Political Theory—Cr 3.

295. Methods of Political Science—Cr 3.

297.298. Seminar—Cr 3.

302. Topics in Public Administration—Cr Ar.

303. Topics in International Relations—Cr Ar.

310. Administrative Theory—Cr 3.

311. Program Analysis and Evaluation—Cr 3.

320. Urban Regional Government—Cr 3.

325. Planning and Organization for Economic and Social Development—Cr 3.

327. Intergovernmental Relations—Cr 3.

331. Seminar in Comparative Politics—Cr 3.

333. Community Political Power Structures—Cr 3.

350. Independent Readings—Cr Ar.

351. The Environment of Public Administration—Cr 3.

397. Method Seminar in Public Administration—Cr 3.

398. Project Seminar in Public Administration—Cr 3.

399. Graduate Thesis—Cr Ar.

193. (State), 195. (Municipal) Internships—Professional experience in either a local government unit or a department or agency of state government. Open to selected students. Reports and readings required. State government option available under the Maine State Government Internship Program enacted by the 103rd Legislature; Municipal Government Internship Program enacted by the 103rd Legislature; Municipal Government option required for the B.A. degree in Public Management. Cr 3 or 6 hrs. Students may not receive more than 6 credit hours for internships within the department.

PSYCHOLOGY (Py)

Professors Antonitis, M. Elias, Goldstone, Hammer, Martindale, Pliskoff, Ryckman, Stone, Stubbs, Wade; Associate Professors Abelson, Farthing, Frey (Chairman), Gold, Hayes, Kulberg; Assistant Professors Birnbaum, Gershman, Lenney, Thorpe; Part-time Instructor Scott; Cooperating Associate Professors Butler, Grant, Homann; Cooperating Assistant Professor Peddicord; Adjunct Professor Allan; Faculty Associates Booth, DeSisto, P. Elias, Gripp, Hines, Levinson, Passini, Phelps, Sanders, Starbird

The instruction offered by the Department of Psychology is designed to acquaint the student with psychology as a biological science and as a social science. The department offers courses that introduce the student to psychological theory, methodology, research findings, and applications of psychological principles.

Requirements for a Major in Psychology

A. A minimum of 36 hours in psychology courses (Note: 48 hours in psychology is the maximum amount of credit that will count toward the 120 hours needed to graduate).

B. The following required courses which must be passed with a grade of C or better.
   1) PY 1—General Psychology-Prerequisite for all other psychology courses
   2) PY 141—Statistics in Psychology I
      PY 145—Principles of Psychological Research—Prerequisite Py 141 (These courses must be taken prior to the Senior year)

3) PY 191—History and Systems of Psychology (May be taken in the Junior or Senior year)
4) Three (3) courses selected from the following alternatives:
   PY 101—Cognition
   PY 151—Motivation
   PY 154—Learning and Motivation
   PY 155—Human Learning
   PY 156—Theories of Learning
   PY 161—Sensation and Perception
   PY 165—Physiological Psychology

C. Majors must accumulate a minimum grade point average of 2.0 in PY courses.
D. No more than six (6) hours of *PY 190—Problems in Psychology* may count toward the 36 hours required.
E. No more than three (3) hours of *PY 193—Field Experience* may count toward the 36 hours required.
F. Students who transfer from other institutions must take a minimum of 24 hours within the department.

In addition, students are encouraged to take courses in related areas such as Anthropology, Sociology and Zoology. Courses in Computer Programming, Physics, and Chemistry would be valuable to the Psychology major.

For ease of reference, the course offerings of the Department of Psychology have been categorized. A brief description of each category precedes it. These descriptions are meant to provide the student with information that may be of importance in decisions about the psychology courses that will be of most benefit to his/her program.

Courses numbered 200-299 are graduate courses that are open to both undergraduate and graduate students. Junior and/or senior psychology majors are encouraged to enroll in some of these courses (especially 222, 224, 238, 257, and 261) if possible. Undergraduates do not necessarily compete with graduate students for grades in such courses. Undergraduates require permission of the instructor to register for 200 level courses.

General Psychology Background

This category consists of Py 1, General Psychology, *which is a prerequisite for all advanced courses in the department* and, hence, is required for the psychology major.

1. General Psychology—A survey of psychology as the science of behavior. Lecture discussions of basic psychological processes, including learning, perception, motivation and emotion, higher mental processes, individual differences, personality and additional selected topics. Participation in resarch to a maximum of 4 hours is expected. Cr 3.

Topics in Psychology

This category includes courses that are of interest both to students who are majoring in psychology and students who are majoring in other fields. Py 1 is a prerequisite for all courses in this category.

102. Psychology of Literature—Psychological approaches to the study of art and literature. Psychoanalytic and Marxist theories, experiemental aesthetics, investigations of literary change, and the application of the methodology of the behavioral sciences to the study of literary phenomena. Cr 3.

103. Applications of Behavior Principles—Methods employed in the experiemental analysis of behavior; principles of respondent (classical) and operant (instrumental) conditioning; applications of principles to the understanding and control of behavior in everyday life situations. Cr 3.

107. Animal Behavior—Several topics in comparative animal psychology, including learning, motivation, sensory processes, behavior genetics, innate behavior, social behavior, and the development of behavior. Various methods of investigating and classifying animal behavior are critically evaluated. Prerequisite: Zo 3 or permission. Cr 3.

108. Theories of Personality—The chief contemporary approaches to the study of personality. Critical issues in personality are covered, in addition to a consideration of assessment techniques and research methods. Cr 3.

109. Psychology of Consciousness—A discussion of the scientific approach to the study of consciousness and altered states of consciousness. Topics include the nature of normal con-

sciousness, cerebral hemispheric differences and the bimodal model of consciousness, daydreaming, stages of sleep, meditation, marijuana intoxication and hypnosis. Emphasis on research methods and results and theoretical interpretations. Cr 3.

110. Psychology of Personal Growth—A discussion of the basic principles of mental health; also is designed to enhance the personal growth and mental health of the student. Mental health exercises and open-group discussions utilized to help the student come to better understand himself and to learn to communicate with others more meaningfully. Cr 3.

112. Abnormal Psychology—The orign, development, and manifestations of the psychoneuroses and major psychoses with a view to a better understanding of deviant behavior in our society; emphasis on the biological, social, and psychological determinants of deviant behavior. Cr 3.

234. Advanced Psychopathology—Intensive readings and discussions of etiology and maladapted behavior emphasizing topics such as schizophrenia, neuroses, sociopathy, etc. Prerequisite: Py 133 and permission. Cr 3.

236. Introduction to Psychodrama—Analysis through psychodramatic situations of the interaction between individual personality and group forces. Exploration through the dramatization of concrete situations of different ways of handling personal and interpersonal problems, whether in the field of education, family relations, industry, etc. Prerequisite: Py 1 or permission of instructor. Cr 3.

237. Advanced Psychodrama—An experimential course that deals more deeply with aspects considered in Introductory Psychodrama, such as, development of self, relations to others, and psychodrama and sociometry as a profession. It offers opportunity to begin practice in directing Psychodrama sessions and to become better acquainted with the literature in the field. Prerequisite: Py 236, Cr 3.

Developmental Psychology Courses

This category contains courses intended to introduce the student to the various subdisciplines of developmental psychology. In addition, it contains courses intended to provide students who plan to enter vocations focusing on children with a specialized background for that work. Py 1 is a prerequisite for all courses in this category.

Selected students may participate in the University Affiliated Program (UAP) in the Department of Pediatrics at Eastern Maine Medical Center. An Interdisciplinary Concentration in Developmental Disabilities is required. (See UAP and Intedisciplinary Concentrations in Index.)

120.121. Child Study Laboratory—Observation and study of preschool children. Individual projects, supplemented by reading and class discussions. Opportunity to assist in guiding the children's activities. First semester emphasizes social development during early childhood, whereas the second semester emphasizes cognitive development. It is recommended that student take Py 123 before enrolling. Rec 2, Lab 3, Cr 3.

123. Psychology of Childhood—A systematic study of the child's behavior and psychological development. Emphasis upon principles underlying development, methods of child study, and practical implications. Cr 3.

124. Psychology of Adolescence—Adolescent development in the physical, intellectual, emotional, and social spheres. Adolescent personality and problems of adjustment in relation to the family, the school and the community, and the world of work. Delinquency and abnormality in adolescents. Cr 3.

125. Social Issues in Developmental Psychology—An introduction to the research on current social issues in developmental psychology. Topic areas may include sex-role development, maternal employment, day care, mass media effects, the role of fathers, compensatory education, the effects of poverty, teacher expectancy effects. Prerequisites: Py 1, Py 123. Cr 3.

125L. Social Issues in Developmental Psychology Laboratory—(Optional). Lab may include Field Placement. Lab 3, Cr 1.

128. Psychology of the Exceptional Child—The development and behavior of the exceptional child. Special emphasis on the practical problems related to the management of children with intellectual, emotional, orthopedic, sensory, and academic handicaps. Prerequisite: Py 123 or permission. Cr 3.

129. Learning in Children—A survey of theories and research findings pertaining to children's acquisition of information, problem solving, and cognitive development. Prerequisites: Py 123, junior standing. Cr 3.

222. Advanced Child Psychology—Reading and evaluation of recent research literature in child psychology with emphasis on children's social development, learning, cognitive development, and acquisition of language. Prerequisite: permission. Cr 3.

224. Experimental Child Psychology—Major research methods, principles, and techniques in experimental study of child behavior; closely supervised research experiences with children. Student will plan and conduct an original investigation. Prerequisite: Py 123, Py 145 or equivalent. Lec 2, Lab 4, Cr 4.

Social Psychology Courses

This category contains courses intended to introduce the student to the various subdisciplines of social psychology. In addition, it contains courses intended to provide students with theory and research in several areas of current professional interest. Occasionally, one division of Py 130 will be limited to psychology majors and students who have a good background in psychology. It is recommended that qualified students enroll in that division, rather than one of the others. Py 1 is a prerequisite for all courses in this category.

130. Social Psychology—An introduction to the study of social behavior from a psychological perspective. Representative topics include culture and personality, attitude formation and change, conformity, leadership and prejudice. Cr 3.

131. Social Psychology and Problems in Contemporary Society—An application of social psychological principles to major problems confronting contemporary American society. Problems under consideration may include institutional racism, international conflict, poverty and overpopulation. Cr 3.

132. Environmental Psychology—An introduction to the study of the transactions between people and their physical environments. Representative topics include territoriality, crowding, personal space, privacy, architectural design of space and self-control and development phenomena. Prerequisite: Py 1. Cr 3.

139. Psychology of Political Behavior—Application of social-psychological principles to the study of political behavior. Political socialization, motivation for participation, political attitudes, and personality factors related to political roles. Prerequisite: Py 130 or permission. Cr 3.

238. Research in Personality—Research studies related to current personality theorizing. Topics may include dogmatism, locus of control, Machiavellianism, need for achievement, and self-esteem. Prerequisite: Py 108 or equivalent, or permission. Cr 3.

261. Advanced Social Psychology—Consideration of current theoretical and methodological issues in social psychology including interpersonal perception, attitude and attitude change, communication and persuasion, language and cognition. Prerequisite: Py 130 or permission. Cr 3.

263. Group Processes—Concepts, methods and findings in the group process. Problems of methodology and conceptualization considered preliminary to formulation of proposals for individual or collective research projects. Prerequisite: Py 261 or Py 130 or permission. Cr 3.

265. Attitudes and Opinions—Nature, development, and measurement of social attitudes. Applications to understanding prejudice, intergroup conflict, political and religious behavior. Prerequisite: Pg 141; Sy 3/4 or Py 130. Cr 3.

Core Psychological Methodology Courses

This category includes courses which are crucial to students' understanding of psychology as a science. Py 141 (Statistics in Psychology I) and Py 145 (Principles of Psychological Research) are required for the psychology major. Students who have any intention of pursuing graduate study in psychology or a related field should be especially concerned with this category of courses and should probably take all of them. In terms of prerequisites, the sequence would be Py 141, Py 145, Py 142. A minimum grade of B in these courses is indicative of ability to do graduate work. Py 1 is a prerequisite for all courses in this category.

141. Statistics in Psychology I—A survey of techniques used to obtain, display, analyze, and interpret data in psychology. Cr 3.

142. Statistics in Psychology II—A consideration of techniques of practical value to the psychologist in analyzing psychological experiments. Prerequisite: Py 141 and Py 145. Cr 3.

145. Principles of Psychological Reseach—Techniques of psychological research. Applications of general methodology and specific techniques to major problem areas in behavioral research. Prerequisite: Py 141. Cr 3.

242. Psychological Methodology—Intermediate level survey of methods and techniques employed by psychologists in the evaluation of data and verification of hypotheses. Prerequisite: Py 145 and Py 141. Cr 3.

243. Correlation Techniques—Intermediate level survey of methods and techniques employed by psychologists to determine extent of covariation in sets of measurements; survey of prediction methods. Prerequisite: Py 141 or equivalent. Cr 3.

244. Psychological Test Theory—Fundamental theoretical bases of test construction emphasizing practical applications along with statistical concepts necessary for proper evaluation of tests and other assessment techniques. Prerequisite: Py 141 or equivalent, permission. Cr 3.

245. Nonparametric Techniques in Psychology—Survey of nonparametric techniques of hypothesis testing uniquely suited to the data of behavioral sciences. Prerequisite: Py 141 or permission. Cr 3.

246. Multivariate Methods for the Behavioral Sciences—The use of analysis of variance in the context of behavioral investigations in which more than one dependent variable is used. Multivariate analysis of variance used in behavioral studies as a protection scheme and as a method for deriving a meaningful composite of behavioral scores will be discussed. Prerequisite: Py 242 and Py 243 or Ms 137 or Ms 138. Cr 3.

General Experimental Psychology

This category includes courses intended to introduce students to basic psychological theory and research. Students who plan to pursue graduate study in psychology should take several of these courses. Py 1 is a prerequisite for all of the courses in this category.

101. Cognition—An introduction to the psychological study of human information processing and thinking. Representative topics include: attention, pattern recognition, short- and long-term memory, semantic memory, visual memory, mental imagery, problem solving, and creativity. Cr 3.

151. Psychology of Motivation—A survey of theory, research methodology and experimentally obtained facts related to the activation and direction of behavior. Cr 3.

154. Learning and Motivation—Fundamental principles of classical conditioning and operant conditioning, including interrelations between learning and motivation. Research data discussed in relation to various theories of learning. Laboratory work emphasizes demonstrations of fundamental learning phenomena in animal subjects. Cr 3.

154L. Learning and Motivation Laboratory—(Optional) Prerequisite: Concurrent with Py 154. Lab 2, Cr 1.

155. Human Learning—Basic principles that underlie the discovery, fixation and retention of new modes of human behavior. Verbal learning, retention, transfer of learning, and concept formation. Cr 3.

155L. Human Learning Laboratory—(Optional) Prerequisite: Concurrent with Py 155. Lab 2, Cr 1.

156. Theories of Learning—The most important psychological theories of the nature of learning including the positions of the functional behaviorists (Thorndike, Skinner, Hull), associationists (Pavlov, Guthrie, Estes) and cognitivists (the Gestaltists, Piaget, and Tolman). Cr 3.

250. Advanced Sensation and Perception—Indepth consideration of theories and research in sensation and perception. Prerequisite: Py 161 or permission. Cr 3.

251. Advanced Physiological Psychology—Reading and discussion on topics of current interest including memory, brain stimulation, neurotransmitter systems and neuronal plasticity. Prerequisite: Py 165 or permission of instructor. Cr 3.

IDL 252. (Zo, Py) Behavior Genetics—Genetic analysis of behavior in several organisms including *Drosophila, Mus* and man. Current literature on behavioral mutants and polygenic behavior will be discussed in depth. Prerequisites: Permission. Cr 3.

257. Controversial Issues in Learning—Intensive consideration of issues that divide important theories of learning. Cognitive vs. S-R formulations serve as framework for lectures and discussions. Topics include: latent learning, latent extinction, place vs. response learning, continuity vs. non-continuity positions, discrimination learning, etc. Prerequisite: Py 156 or equivalent. Cr 3.

258. Advanced Theories of Learning—An advanced survey of the most important S-R and cognitive theories of learning. Fundamental learning phenomena are described along with the explanations offered by the classical learning theories of Hull, Tolman, Skinner, and others. Recent research with important theoretical implications is also discussed. Prerequisites: Py 154 or 156 or permission. Cr 3.

259. Advanced Experimental Analysis of Behavior and Its Application—Consideration of operant and respondent conditioning. Topics include: reinforcement and reinforcement schedules, chaining and condition reinforcement, stimulus control and discrimination, punishment and avoidance. Applications to human behavior are discussed. Prerequisite: Py 156 or equivalent. Cr 3.

267. Advanced Cognitive Psychology—An advanced survey of cognitive psychology. Representative topics include a comparison of the cognitive or information processing paradigm as contrasted with behavioristic and psychodynamic paradigms, feature analysis and pattern recognition, memory storage and retrieval, attention, psycholinguistics, problem solving and neuropsychological bases of cognitive processes. Prerequisite: permission. Cr 3.

280. Research Methods in Psychogerontology—A introduction to research methods and background literature in psychogerontology from which the student will develop an understanding of the relationship between intellectual processes and normal and abnormal psychobiological processes. Prerequisite: Py 180 or permission of instructor. Cr 3.

161. Sensation and Perception—A systematic examination of selected sensory and perceptual processes. Emphasis on experimental method, research findings and theoretical interpretations. Prerequisite: Py 145 or permission. Cr 3.

161L. Sensation and Perception Laboratory—(Optional) Prerequisite: Concurrent with Py 161. Lab 2, Cr 1.

165. Physiological Psychology—Physiological bases of behavior with emphasis upon the development and function of the nervous system and the sense organs; the relation between psychological processes and psychological activity. Prerequisite: a basic course in zoology; Py 145 is recommended. Cr 3.

180. Psychology of Aging—The study of the psychology of aging and the aged with an emphasis on research methods and changes in learning, memory, intelligence etc. in relationship to biological changes and health status. Prerequisite: Py 145 and 165. Cr 3.

Advanced Undergraduate Psychology Courses

This category contains courses which are generally reserved for upperlevel psychology majors, although some of these courses may be of interest to students in related fields. Py 191 (History and Systems of Psychology) is required for the psychology major. Py 190 (Problems in Psychology) affords students an opportunity to pursue psychological research in conjunction with one or more faculty members. Students who plan to apply for graduate study should attempt to get involved in research if possible. *Only 6 hours of Py 190 credit will count toward the psychology major.* Py 1 is a prerequisite for all courses in this category.

190. Problems in Psychology—Opportunity to carry out a particular research problem under supervision. Students *must* file a special form for this course during the first week of the semester; the form may be obtained in the Department office. Only 6 hours of credit in Py 190 will count toward the psychology major. Py 145 and permisison. Cr Ar.

191. History and Systems of Psychology—Surveys the development of psychology as an experimental science. It begins with the earliest (Greek) views on the nature of man and traces the evolution of such views through Christian theology, the Renaissance and British Associationism. A consideration of Scottish and German Faculty Psychology is followed by a survey

of 19th century developments in physiology that led directly to the birth of experimental psychology. The 20th century is touched upon only briefly: Gestalt Psychology and Behaviorism. Also considered are such special topics as vitalism in the life sciences and the mind-body problem in psychology. Cr 3.

193. Field Experience in Psychology—Complements formal classroom education by offering practical experiences in a wide variety of applied settings in which psychologists function, such as schools, psychological clinics, hospitals, and government and private agencies. Requirements include a written proposal outlining the experience planned, goals of the plan, relationship of the course to the student's program, periodic conferences with the faculty supervisor and a final written report. Three credit hours may fulfill major requirements and *only* 6 hours may count toward graduation. Prerequisites: Nine hours in psychology and permission of a faculty supervisor. Cr 1-3.

194. Seminar in Issues in Contemporary Psychology—A review of some of the current theoretical issues and research findings in the general areas of psychology. Cr 3.

SOCIOLOGY (Sy)

Associate Professor Gallagher (Chairman); Professors Fenn, Maccoby; Associate Professors Cohn, Guptill, Markides, Marks, Watkins, Whitaker; Assistant Professors Barkan, Berkun; Lecturer Walker

The Department of Sociology offers courses designed to further the student's perception and understanding of society through the study of culture, social structure, major social institutions, social processes, and social behaviors.

Students may elect to meet all their major requirements with sociology courses or may choose to participate in the social welfare program in addition to the basic major in sociology.

Students who wish to explore the requirements for graduate study, or professional careers in sociology, or in social welfare, should consult with the departmental secretary who will direct them to an appropriate advisor.

Selected students may participate in the University Affiliated Program (UAP) in the Department of Pediatrics at Eastern Maine Medical Center. An Interdisciplinary Concentration in Developmental Disabilities is required. (See UAP and Interdisciplinary Concentrations in Index.)

Requirements for Majors

The student who majors in the department must complete satisfactorily a minimum of 36 hours of departmental course work.

The following basic courses are required of all departmental majors:

Sy 3.	Introduction to Sociology
Sy 110.	Social Organization
or	
Sy 160.	Major Ideas in Sociology
Sy 190.	Logic of Sociological Inquiry
Sy 191.	Practicum in Sociological Research
or	
Sy 193.	Practicum in Experimental Research

Twenty-four hours of electives in sociology, in addition to the basic courses above, are required of all sociology majors. Social welfare students meet this requirement while completing their program.

A grade of C or better is mandatory in all required courses (including Py 123 in the social welfare program), with a 2.0 grade point average in the major.

The Junior English Proficiency requirement, which must be completed in the junior year by all sociology majors (including social welfare students) may be met by passing, with a C grade or better, Eh 7—Intermediate Composition, or Eh 17—Advanced Professional Exposition

Social Welfare Program

The social welfare program is designed to prepare beginning-level professional social workers, able to work in a variety of settings, with special emphasis on preparation for practice in the rural or small community setting. The program has been certified by the Council on Social Work Education as having met the accreditation standards for baccalaureate social work education. The social welfare program is open to students who major in sociology. Students from other disciplines may take selected courses, provided they have met the prerequisites.

Field learning is a vital and essential component of the social welfare program. Learning in the field is designed to correspond with specific courses and provides gradual, increased exposure to the social welfare field. By the senior year, students should be able to integrate and apply classroom knowledge in their field practicum.

All students enrolled in the social welfare program are required to complete the basic sociology requirements outlined above, as well as the following social welfare sequence:

SW 120. Introduction to Social Work and Social Welfare

SW 140. Social Welfare Policy and Issues

SW 161. Social Work Methods I

SW 162. Social Work Methods II

SW 163. Social Work Methods III

SW 180. Field Practicum in Social Work (2 semesters)

In addition to the above, a sequence in human behavior and the social environment is required and includes the following courses: Py 123—Psychology of Childhood (Py 1 is a prerequisite), Sy 127—Self and Society, and Sy 138—Race and Culture Conflict. Prior to the field practicum (SW 180), volunteer or work experience is required. Details on this requirement can be found in the *Social Welfare Program Guide* available in the Sociology Office, 221 East Annex.

Students interested in the social welfare program should plan to take SW 120—Introduction to Social Work in the sophomore year, prior to declaring the major in Sociology. When declaring the major, students complete a program application form. This is reviewed by social welfare faculty and an interview is scheduled to assist the student in planning a meaningful educational experience geared toward the individual student's interests, needs and career goals.

Additional information on the social welfare program (including an application form) may be found in the aforementioned *Social Welfare Program Guide*.

Sociology (Sy)

3. Introduction to Sociology—The fundamental concepts, principles, and methods of sociology; analyzes the influence of social and cultural factors upon human behavior; evaluates effect of group processes, social classes, stratification, and basic institutions on contemporary society. Cr 3.

4. Social Problems—Introduction to the structure of inequality in American society and the consequences for community and democracy. Economic inequality, the issue of poverty, social inequity and social stigma, the connections between wealth and power, societal priorities. Prerequisite: Sy 3 or permission of instructor. Cr 3.

IDL 24 (ARE, Sy). Sociology of Rural Life—Significance of rural society in American culture. The impact of forces of change, including population movement. The significance of changes in the social systems of communities, family, religion, education, and stratification. Cr 3.

108. Problems of Violence and Terrorism—The nature and causes of violence, terror and assassination in America, modern and pre-modern societies. The social structure of terrorist organizations. The institutionalization of terror as an instrument of policy by national states. Prerequisite: Sy 3 or permission of instructor; not open to freshmen. Cr 3.

109. Death and Society—The study of death as a source of insights and theories concerning the relationship of society to the individual. The student will be introduced to functionalist and psychoanalytic perspectives on death in the work of Durkheim, Malinowski, Geertz, Parsons, Brown, and Marcuse. The course will examine the killing and suicide, games and festivals,

ecstatic movements, memorials, and contact with the dead in American society. Prerequisite: Sy 3 or permission of instructor; not open to freshmen. Cr 3.

110. Social Organization—An analysis of the nature of social order within society. Prerequisite: Sy 3 or permission of instructor; not open to freshmen. Cr 3.

111. Religion and American Society—Contemporary religious phenomena will be interpreted as expressions of conflict and consensus in American society. Religious dimensions of individual life-styles, established and deviant therapies, social protest, popular culture, and national ideology. Disorder and renewal in established churches; alienation and emerging cults. Prerequisite: Sy 3 or permission of instructor; not open to freshmen. Cr 3.

112. Political Sociology—The application of sociological conceptual frameworks and theories in the interpretation and explanation of political phenomena like voting behavior, power systems, and political processes. An introduction to the literature and issues of political sociology. Prerequisite: Any of the following: Sy 3, Pol 1, Pol 10, Pol 12 or permission of instructor; not open to freshmen. Cr 3.

113. Deviant Behavior—Behavior defined by society as deviant. The processes by which an act or actor becomes defined as deviant and the nature of occupying a deviant role. The "techniques" of deviance and the acquisition of a deviant self concept. Prerequisite: Sy 3 or permission of instructor; not open to freshmen. Cr 3.

115. Sociology of Youth—The way in which American society socializes its young people and the roots of generational conflict. The development of youth culture, political confrontation, social control of identity-formation, socialization functions of schools, delinquency as a response to class society. Prerequisite: Sy 3 or permission of instructor; not open to freshmen. Cr 3.

116. Sociology of Aging—Analysis of the demographic and sociocultural factors in aging, the aging individual as a person, older people as groups and aggregates within the the culture and structure of a changing society, the manner in which society attempts to meet the needs of aging people, and the aged. Prerequisite: Sy 3 or permission of instructor; not open to freshmen. Cr 3.

118. Sociology of the Family—A sociological approach to the study of the family, including the structure of social relationships, the modern American family as a social institution, the cultural background of the family, and the impact of social change. Prerequisite: Sy 3 or permission of instructor; not open to freshmen. Cr 3.

119. Introduction to Statistical Research in Sociology—Introduction to how statistical methods are utilized in sociological research. Topics include: the measurement of social variables; the presentation and description of both quantitative and qualitative data. Descriptive statistics. Introduction to probability theory and its applications. Statistical measurement of association. Sampling, parameter estimation, hypothesis testing. Prerequisite: Sy 3 or permission of instructor. Cr 3.

IDL 124. (ARE, Sy). Contemporary Rural Problems—A problem-oriented, class participation course focusing on the trends taking place in contemporary rural society. Includes rural population displacement and mobility, poverty, industrialization; consequent changes in occupational composition, and related changes. Prerequisite: IDL 24 or equivalent. Cr 3.

126. Sociology of Urban Life—A descriptive and analytical approach to the study of city life. Emphasis on environment, social organization, the ecological processes, population, areas, housing, and maladjustments. Prerequisite: Sy 3 or permission of instructor; not open to freshmen. Cr 3.

127. Self and Society—The behavior and symbolic processes of individuals who occupy positions in social structures, organizations and groups. The behavior of individuals as it is controlled, influenced, or limited by the social environment. The manner in which the behavior of individuals reacts upon, shapes, and alters social structures and enters into the functioning of groups. Prerequisite: Sy 3 or permission of instructor; not open to freshmen. Cr 3.

129. Sociology of Sex Roles—Analysis of contemporary definitions of femininity and masculinity within American culture. Emphasis upon the interpersonal and institutional dimensions of this phenomena. The desirability and sources of social change. Prerequisite: Sy 3 or permission of instructor; not open to freshmen. Cr 3.

IDL 129. (ARE, Sy). The Individual and the Community—Analysis of the functioning and structure of the community. Emphasis on ways in which individuals and groups are affected by community dynamics. Community project. Prerequisite: IDL 24 or Sy 126 or permission. Cr 3.

130. American Culture and Social Structure—Mainstream American culture and social structure at the most general level. The major institutional framework of our society and the meaning systems that underlie it. Distinctive social problems as products of our culture rather than as incidental to it. Prerequisite: Sy 3 or permission of instructor; not open to freshmen. Cr 3.

131. Canadian Society—Provides the non-Canadian student with an overview of the structure of Canadian society. Focus on two broad areas: social institutions and social processes. Prerequisite: Sy 3 and at least one semester of Canadian history, or permisson of instructor; not open to freshmen. Cr 3.

135. Human Ecology—Spatial distribution of human beings and related activities and social processes. Prerequisite: Sy 3 or permission of instructor; not open to freshmen. Cr 3.

137. The Sociology of Mental Illness—Examination of the sociological concepts of mental illness. Analysis of the relationship between mental illness and the sociological factors responsible for these disorders. Cross-cultural examination of mental illness. The nature and structure of mental care institutions. Prerequisite: Sy 3 or Py 1 or permission of instructor; not open to freshmen. Cr 3.

138. Race and Culture Conflict—Analysis of factors involved in group conflict, with emphasis on conflict between minority groups in contemporary societies. Prerequisite: Sy 3 or permission of instructor; not open to freshmen. Cr 3.

139. Sociology of Medicine—The relationship between sociocultural factors and the occurrence of disease and the social systems which are developed in the treatment and prevention thereof. Prerequisite: Sy 3 or permissoin of instructor; not open to freshmen. Cr 3.

142. Population and Society—Population processes and their efforts on society. Includes fertility, migration, mortality; population, resources and technology; population, social change and economic development; family planning and population policy. Prerequisite: Sy 3 or permission of instructor; not open to freshmen. Cr 3.

143. The Sociology of Counter-Cultures—Counter-cultures in America: what gives rise to their emergence, who are their advocates, what impact do they have on an ongoing cultural tradition, and when do they generate social structures which actively "carry" them? The "hippie" phenomenon, the recent communal movement, radical feminism, and others. Prerequisite: Sy 3 (Sy 130 recommended) or permission of instructor; not open to freshmen. Cr 3.

147. Wealth, Power and Prestige—Analysis of social inequality within society. Theories and topics within the area of social stratification. Prerequisite: Sy 3 or permission of instructor; not open to freshmen. Cr 3.

160. Major Ideas in Sociology—The sociological theories of Marx, Weber, Durkheim, Mead and others. Developments in sociological theory as related to methodology, social issues, and current trends in contemporary sociology. Prerequisite: Sy 3 or permission of instructor; not open to freshmen. Cr 3.

163. The Sociology of Knowledge—The relationship between knowledge and social interaction. The general characteristics of knowledge as a social phenomenon. The problem of knowledge as being both influenced by and an influence upon the social structure. Prerequisite: Sy 3 or permission of instructor; not open to freshmen. Cr 3.

165. Evolution, Revolution and the Future—Review and analysis of major principles in social change such as social evolution and revolution, their relevance in understanding contemporary social processes in American, Western, Communist and developing societies. Problems of the future society. Prerequisite: Sy 3 or permission of instructor; not open to freshmen. Cr 3.

169. Social Movements as Protest, Dissent and Rebellion—The concern here is with *conscious* attempts by large numbers of people to bring about change in society through collective action. Emphasis on the social sources, development, internal processes and social bases of collective action in movements like those for socialism, cooperatives, utopian experiments, black nationalism, civil liberties and student power. Prerequisite: Sy 3 or permission of instructor; not open to freshmen. Cr 3.

170. Small Group Analysis—Communication and interaction patterns within small groups identified and analyzed. Course involves participation in and observation of such interaction. Prerequisite: Sy 3 or permission of instructor; not open to freshmen. Cr 3.

173. Topics in Political Sociology—An examination in depth of two or three topics concerning the relationship of the social and political orders. Topics may vary from year to year. They include political consensus and cleavage, political legitimacy, freedom and equality, the political community, political pluralism, totalitarianism, political revolution, political development, the politics of mass society. Prerequisite: Sy 3 (Sy 112 recommended), or permission of instructor; not open to freshmen. Cr 3.

174. Political Extremism in the United States—The anatomy, causes and styles of political extremism in the United States, with some reference as well to political extremism in other selected Western democracies. The focus is on anti-regime attitudes, beliefs, advocacy and behavior across the political spectrum. The styles of political extremism considered will range from the non-violent anti-politics of some true believers to the violence of others, including revolutionaries who would bring down a democratic regime and vigilantes who would sustain it. Prerequisites: Any *one* of the following: Sy 3, Pol 1, Pol 10, or Pol 12; not open to freshmen. Cr 3.

182. The Sociology of Religion—Problems in the description and explanation of religious beliefs and practices. Marx, Weber, Freud, Durkheim. The religious dimensions of social theory; the social construction of religious beliefs. Definitions and measurements of religious phenomena. Religion in primitive and modern societies. The future of illusions. Prerequisite: Sy 3 and Sy 111, or permission of instructor. Cr 3.

190. Logic of Sociological Inquiry—The concern here is with the logical and conceptual supports of sociological research. The focus is on application to problem formulation and design in sociological research. Prerequisite: Sy 110 or Sy 160 or permission of instructor. Cr 3.

191. Practicum in Sociological Research—Techniques of data collection, including observation, participation, interviewing, questionnaires, and tests. The process and logic of data analysis. Field work to include conducting and analyzing a sociological study. Prerequisite: 12 hours of sociology, including Sy 190, senior level, or permission of instructor. Cr 3.

193. Practicum in Experimental Research—Techniques of experimental research in Sociology, including hypothesis construction, operationalization and testing. Students will work primarily in the small groups laboratory running experiments and analyzing data. Prerequisite: 12 hours of Sociology, Sy 190, senior level or permission of instructor. Cr 3.

197.198. Departmental Projects—By permission of an instructor only. Cr 1-3.

Social Work (SW)

120. Introduction to Social Work and Social Welfare—The introductory course in the social welfare sequence. Focus on the history and development of social welfare and social work, the basic values and concepts of social work practice and the major fields of social work practice. An observation experience in an agency is provided. Sophomore level. Cr 3.

140. Social Welfare Policy and Issues—Provides an analytic perspective on the provision of social services and the interrelatedness of practice and policy analysis. The dimensions of choice in social welfare policy and major issues in provision of services are examined. Prerequisite: SW 120 or permission of instructor. Cr 3.

161. Social Work Methods I—An introductory course in social work theory and methods. The functions and roles of the social worker, the value base of social work practice, and the processes of providing service are explored. Prerequisite: SW 140 or permission of instructor. Cr 3.

162. Social Work Methods II—The theory and methods of providing direct services to individuals, families and groups examined. Emphasis on experiences leading to the development of intervention skills such as self-awareness, interviewing and communication skills and techniques. Provides integration of the classroom and field instruction experiences. Prerequisite: SW 161. Limited to sociology majors in the social welfare program. Cr 3.

163. Social Work Methods III—An exploration of social work methods directed toward bringing about changes in social institutions and the relations of people to those institutions. Social work roles of advocate, mediator, resource mobilizer, program initiator and planner, coordinator, and organizer are explored. Classroom material integrated with the student's second semester of field instruction. Prerequisite: SW 162. Limited to sociology majors in the social welfare program. Cr 3.

180. Field Practicum in Social Work—Generalist social work practice in community agencies designed to provide students the opportunity to apply social work knowledge and skills directed toward planned intervention and change efforts. Prerequisite: Senior social welfare students only. Twelve credit hours required; six per semester for two semesters, variable by permission only.

197.198. Independent Projects in Social Welfare—By permission of a social welfare instructor only. Cr 1-3.

SPEECH COMMUNICATION (SC)

Professor Dopheide; Associate Professors Burns, Gillespie, Hartman, LaRiviere, McKerrow, Pettit, Van Rheenen (Chairman); Assistant Professors Davies, Hutchinson, Langellier, Pickering; Lecturer McCready; Faculty Associates Henri, Kerr, Olsen, Pronovost; Professor Emeritus Gardner

Departmental Studies lead to a B.A. in Speech Communication. The programs offered by the department are designed to expand the student's awareness and understanding of the genesis, development, functions, roles, and uses of spoken communication behaviors. Departmental majors may concentrate in either Human Communication Studies or in Communication Disorders. The undergraduate program in Human Communication Studies prepares majors as specialists in the theory, research, and pragmatics of spoken communication between persons, whether the communicating occurs within one-to-one, small group, organizational, or public contexts. The undergraduate program in Communication Disorders equips majors with pre-professional competencies that should enable them to undertake advanced Master's study recommended for entrance to the profession of speech pathology or audiology.

Requirements for Majors—All departmental majors are required to complete three of four core courses within the department: Communication and Human Behavior (SC 109), Communication and Society (SC 111), Language and Speech Development (SC 180), and Introduction to Speech Science (SC 184). Outside the department, majors must complete a total of nine hours in Linguistics, Statistics, Computer Science, and Foreign Language. Six of the nine hours must be in one of the four areas. Any of the above may be used to meet college as well as departmental requirements.

Persons in Human Communication Studies who are interested in *Applied Communication* in business, organizations, or professions may supplement coursework in Speech Communication with appropriate courses in Business Administration and other fields and thereby prepare themselves as communication specialists and consultants in a non-academic career. Such persons are encouraged to take Field Experience in Speech Communication (SC 150) and to actively participate in the University Forensic Program (SC 51.52). Other course sequences coupled with collateral areas in other departments will permit the student to specialize in *Human Communication Theory and Research*, which includes such sub-areas as Interpersonal and Small Group Communication, Persuasion and Argumentation, Humanistic and Social Scientific Theories of Communication, Analysis and Criticism of Discourse, Role of Public Discourse in History, and Aesthetic Dimensions of Communication. Persons may also specialize in *Speech Communication Education* if they plan to become teachers at the elementary or secondary levels. They should plan to take Teaching of Speech Communication (SC 197) and appropriate collateral courses in Education, English, and Theatre. Specific requirements for the program or recommendations for the sub-areas are available in the departmental office.

Persons who declare a major in Speech Communication but, in addition, desire to concentrate in Communication Disorders, must meet a set of special entrance requirements to that program. The requirements are as follows: (1) a GPA of at least 2.8 in all College of Arts and Sciences' courses during his/her first three semesters of University work, providing that average is based on at least 30 hours of work in the College; (2) three letters of recommendation addressing specific concerns relevant to a career in the field; (3) a statement of extracurricular or co-curricular activities (both high school and university); and (4) attendance at a series of group and individual meetings on career choice sponsored by the Department. All materials are due before April 1 of the academic year preceeding desired entrance to the pro-

gram. Students who have accumulated 53 or more semester hours (junior status), but have not yet completed 30 semester hours in Arts and Sciences courses may gain admission to the program on the basis of a special review by the Department Admissions Committee. Specific rationale, details on the program requirements, and application forms are available in the departmental office.

All majors are expected to take advantage of the laboratory and service opportunities provided through the Conley Speech and Hearing Center and the University Forensic Program. The Conley Speech and Hearing Center provides training opportunities for those preparing for careers as speech clinicians and provides services for persons who are speech, language, and hearing impaired. The University Forensics Program offers practical experience in debate, negotiation, discussion, speech making, and oral interpretation of literature both in local area and in the nation.

The department offers programs leading to the Master of Arts degree. Further details may be found in the Graduate School Catalog.

Courses in Speech Communication (SC)

2. Fundamentals of Interpersonal Communication—The basic elements of interpersonal communication, with special emphasis on developing knowledge and skills applicable to face-to-face interactions between individuals and in small groups. Participation in research to a maximum of 3 hours is expected. Cr 3.

3. Fundamentals of Public Communication—The nature and problems of public speech communication, with practical experience in representative speaking situations. Participation in research to a maximum of 3 hours is expected. Cr 3.

6. Oral Communication of Literature—An introduction to the art of reading literature aloud for an audience. The study of interpreting the meanings of various selections of literature and conveying these interpretations to an audience through oral performance. The development of a deeper understanding and appreciation of literature and a greater expressiveness as a communicator. Participation in research to a maximum of 3 hours is expected. Cr 3.

9. Parliamentary Procedure—The principles and methods by which groups organize themselves and transact business with efficiency and fairness. Cr 1.

35. Directed Speech Improvement—Individualized evaluation and self-improvement programs focused on the spoken communication needs of students presenting problems in language, speech, fluency, voice, or hearing. May be repeated. Permission of director, Conley Speech and Hearing Center. Cr 1. Pass/Fail.

45. Small Group Communication—An introduction to the principles of the decision-making process involved in the area of discussion and group inquiry as a means of solving problems. Practical application of these principles through classroom experiences. Prerequisite: SC 2 or equivalent. Cr 3.

47. Argumentation and Public Advocacy—An introduction to the principles of the decision-making process involved in the area of debate and advocacy, with emphasis on the use of reason in controversy. Practical application of these principles through classroom experience. Prerequisite: SC 3, or equivalent. Cr 3.

51.52. Forensic Practicum—Supervised experience in the University Forensic Program in such communicative activities as public debating, discussing, speaking, and oral reading. Prerequisite: SC 3 or SC 6, or prior experience in forensics. Cr 1. May be repeated.

56. Intermediate Oral Interpretation—More advanced techniques of analyzing and performing literature. An in-depth study of one literary genre, such as poetry, fiction, or drama; an exploration of literature and its cultural context; and experimentation with new literary forms and performance techniques. Each student presents a short program of readings from the works of one author for a public audience. Prerequisite: SC 6 or permission. Cr 3.

57. Business and Professional Speaking—Advanced study and practice in specialized audience analysis, strategies and tactics, conference procedures, interviewing techniques, and delivery of scientific and professional presentations. Prerequisite: SC 2 or 3 or permission. Cr 3.

77. Interviewing—A study of the basic principles of interviewing, with emphasis on their practical application in a variety of situations. Prerequisite: SC 2 or 3. Cr 3.

87. Public Relations: Oral Communication Strategies—The study of those activities which help to create public understanding and acceptance of an organization's policies and programs. The course is approached from the speech communication viewpoint, emphasizing various aspects of direct personal contact. Prerequisite: SC 57, or permission. Cr 3.

96. Nonverbal Communication—Examines important non-linguistic variables related to human interactions. Specific emphasis on the effects of kinesics, proxemics, paralanguage and other code systems as they affect meaning in communication efforts. Prerequisites: SC 2, 3, or 6. Cr 3.

101. Persuasive Speaking—The principles involved in influencing an audience, with emphasis on the means by which speakers try to influence the attitudes, beliefs, values, and actions of others. Experience in creating and evaluating persuasive messages and campaigns. Prerequisite: SC 2 or 3. Cr 3.

103. Criticism of Public Discourse—An examination of the principle elements involved in the criticism of public discourse, with emphasis on the primacy of the audience, identification strategies, rational argument, and style. Prerequisite: SC 2, 3, or 6. Cr 3.

IDL 105. Women of Maine: An Autobiographical Approach—An ongoing study of the language and communication patterns of women and men. Students learn oral history techniques and tape interviews with persons born in Maine. Interview transcripts are prepared and analyzed based on the historical period under examination and on relevant language and communication theories. Taught by cooperating faculty in Speech Communication, Anthropology, and History. Prerequisite: No freshmen. Cr 3.

109. Communication and Human Behavior—An examination of social and behavioral science approaches to the study of verbal and nonverbal communication; emphasis on the nature, development, and use of theories. Prerequisite: SC 2 or 3. Cr 3.

110. Mass Communication and Human Behavior—The communicative impact of mass media (e.g., television, radio, newspapers), and the uses of the media in other communicative contexts (e.g., small group and interpersonal situations). Current mass communication theories and research studies are explored. Prerequisite: SC 2, or SC 3, or JB 1. Cr 3.

111. Communication and Society—An examination of humanistic approaches to the study of communication; emphasis on classical and contemporary rhetorical theories of communication in society. Prerequisite: SC 2, 3, or 6. Cr 3.

130. Introduction to Communication Disorders—A survey of the major disorders of language, speech, and hearing with attention to their recognition and the principles of their treatment. Recommended for all teachers. Not open to freshmen. Cr 3.

144. Communication Strategies in Political Campaigns—Examines the nature and impact of diverse communication strategies in political campaigns; emphasis on analysis of Congressional and Presidential campaigns. Prerequisite: SC 3, or permission. Cr 3.

150. Field Experience in Speech Communication—Approved work experience for departmental majors in the application of speech communication to practical, theoretical or research problems in any public service agency, business, or other setting approved by the department. Requirements include an initial written application showing the projected experience and its relevance to speech communication, conference with faculty supervisor, periodic logs or summaries, plus a final written report. Not more than 12 hours may count toward graduation and not more than 6 hours may count toward the departmental major. Prerequisites: completion of at least 15 hours in speech communication and permission of the departmental field experience committee. Cr 1-6.

154. Communication Development in Children—Examines the development of pragmatic communication behaviors in children (primarily preschool through grade 8). Strategies for assessing, researching, and facilitating children's communicative development are considered. Prerequisite: juniors or seniors. Cr 3.

180. Language and Speech Development—The psychological and sociological foundations of language development and the sequential aspects of speech development. The interrelationships of the natural and behavioral sciences in understanding the speech and language processes. Limited to juniors and seniors or by permission. Recommended for teachers. Cr 3.

181/182. Fundamentals of Speech Pathology—The diagnosis and treatment of speech disorders presented by children and adults. Emphasis on the interpersonal therapeutic ex-

perience and the basic procedures followed by the speech and hearing clinician. Not recommended for classroom teachers. Prerequisite: permission. Limited to junior or senior majors. Lec 2, Lab 2, Cr 3.

183. Anatomy and Physiology of the Speech Mechanism—The structures, the muscular system, and the nervous system underlying breathing, phonation, articulation, and language. Emphasis on normal neurophysiological function; attention to organic pathologies affecting speech and language. Limited to juniors and seniors. Cr 3.

184. Introduction to Speech Science—An introduction to research findings on the importance of acoustical, physiological, and preceptual factors in speech production and reception. Methodology and instrumentation employed in such research are surveyed. Limited to juniors and seniors. Cr 3.

186. Clinical Practicum I—Supervised therapy experience with selected clients in the Conley Speech and Hearing Center. Minimum of four contact hours each week, plus weekly supervisory conference. May be repeated for a maximum of six credits. Prerequisite: 18 hours in communication disorders, including SC 181/182. Cr 4.

187. Organic Speech Disorders—A study of the diagnosis and treatment of speech disorders of organic origin: cleft palate, cerebral palsy, aphasia, and dysarthrias. *Not recommended for classroom teachers.* Prerequisite: SC 181, SC 130. Cr 3.

188. Hearing Impairment—An introduction to normal auditory function as a basis for understanding disorders of hearing. Procedures for hearing assessment and rehabilitation methods used with the hearing-impaired person. Limited to juniors and seniors. Cr 3.

189. Introduction to Audiology—The field and profession of audiology. A study of the methods of hearing assessment, including their administration and interpretation. Audiometric identification of hearing loss and rehabilitation of the hearing-impaired person. Prerequisite: SC 188. Cr 3.

190. Ensemble Interpretation—The theories and styles of oral presentation of literature, with application of the basic principles to the problems of group interpretation of literature. Emphasis on methods, materials, and actual group reading. Prerequisite: SC 6. Cr 3.

192. Communication in Organizations—The study of communication behavior in the organizational context. Examination of research and theory on recurring communication problems in complex organizations (including business, industrial, educational and service agencies). Attention is given to communication training and assessment in organizations. Prerequisite: juniors or seniors. Cr 3.

195.196. Problems in Speech Communication—For the advanced student desiring to study a particular problem under the guidance of a member of the staff. Prerequisite: permission of department chairman. Cr 1-3.

197. Teaching of Speech Communication—Study of contemporary teaching methods. Practical application through such activities as construction of course outlines and units, microteaching, and evaluations. Some attention to co-curricular activities and professional organizations. Prerequisite: 12 hours of departmental courses. Cr 3.

198. Topics in Speech Communication—In-depth analysis of selected subjects, designed to explore new areas of research and/or current issues. Topics may vary with each semester. Prerequisite: Sophomore standing. Cr 1-3.

Graduate Courses (SC)

203. Seminar in Rhetorical Criticism—Cr 3.

204. Persuasion—Cr 3.

206. Rhetorical Theory—Cr 3.

208. Communication Theory—Cr 3.

255. History of American Public Discourse—Cr 3.

281. Articulation Disorders—Cr 3.

282. Voice Disorders—Cr 3.

283. Fluency Disorders—Cr 3.

285. Children's Language Disorders—Cr 3.

286. Current Issues in Clinical Practice—Cr 1-3.

288. Aural Rehabilitation—Cr 3.

301. Seminar in Research Methods—Cr 3.

302. Teaching Speech Communication in College—Cr 1.

384.385. Diagnostic Procedures in Speech Pathology—Cr 2.

386. Clinical Practicum II—Cr 1-2.

387. Seminar in Speech and Hearing Services—Cr 3.

388. Seminar in Adult Language Disorders—Cr 3.

389. Seminar in Consultation and Supervision—Cr 3.

390.391. Directed Research—Cr 1-3.

399. Graduate Thesis—Cr Ar.

ZOOLOGY (Zo)

Professors Allen, Dean, Dearborn, De Witt, Gilmartin, C. Major, J. McCleave, Mun, Pratt, Vadas, Valleau, Roberts (Chairman); Associate Professors DeWitt, Haines, Hidu, Moring, Ringo, Shick, Stanley, Watling, Wood; Assistant Professors Gelder, Glanz, Kornfield, Sidell, M. Tyler, S. Tyler, Waddell; Lecturers Bailey, Beauregard, Bessette, Chapman, Dahl, Eicher, Fell, Guinard, Kaiser, LaMarche, Malvesta, McGlauflin, Mobraaten, Palmer, Rundell, Russell, Saunders, Stocks, Wiebe, Winter, Wohlgemuth, Wlodarski; Part-time Instructors B. Cook, Dowse, M. Major, B. McCleave, Weatherbee

The Department of Zoology offers a varied program for the study of animal biology. This includes all aspects of animal life, such as anatomy, physiology, embryology, heredity, and ecology. Thus, a curriculum can be tailored to meet the needs of the individual student. To this end each major student is assigned a senior faculty member as his academic advisor, and close faculty-student relationship is emphasized.

Upon graduation, a zoology major may enter various areas of education, industry and research. Zoology graduates hold positions as varied as museum curator, teacher (elementary to college level), hospital administrator, marine biologist, ranger-naturalist, medical and biological illustrator, medical researcher, and science writer.

A zoology major may prepare also for graduate study in the various areas of biology (see Graduate Catalog) and for professional training in medical and dental schools, medical technology, optometry, and in other health sciences. Most students aspiring to Health Profession careers are zoology majors, but usually must continue their education in specialized professional schools.

The Zoology Department offers work leading to the degrees of bachelor of arts in zoology, master of science in zoology and doctor of philosophy. It also administers the program leading to the degree of bachelor of arts in medical technology. A curriculum leading to the degree of bachelor of arts in biology is also available. The department also offers a Master of Science program in Medical Technology.

The department maintains a cooperative graduate program with The Jackson Laboratory, Bar Harbor, Maine, for the study of mammalian genetics. It is a cooperating member of the Ira C. Darling Center, Walpole, Maine, a branch of the University which provides facilities for marine-oriented studies. The Maine Cooperative Fishery Unit provides opportunity for training and research in fishery science. It is operated by the University under a cooperative agreement with the U.S. Fish and Wildlife Service, and the Maine Department of Inland Fisheries and Wildlife. The Fishery Unit staff are members of the Zoology Department. Cooperative research programs are under way with members of the staff at Huntsman Laboratory, St. Andrews, N.B., Canada. The department includes a federal unit conducting research on aquatic environmental pollutants.

Facilities

The Zoology Department is housed in Murray Hall, a modern structure of approximately 60,000 square feet of floor space, which provides well-equipped teaching and research

laboratories. Special facilities include RCA EMU-3G, Philips 201, and AMR 1000 scanning electron microscopes, a GE 250 KVP X-ray machine, a Packard liquid scintillation counter, a central micro-technique facility and an aquatic laboratory which supplies special well water to aquaria. Darkrooms for photography and autoradiography, and cold rooms are provided in Murray Hall. Air-conditioned animal quarters for breeding colonies are maintained by a full-time attendant. The Zoological Collections of various animal groups are described elsewhere, under Scientific Collections.

Requirements for the Zoology Major

The Department requires the following courses for the B.A. in Zoology:

Bio 1/Zo 4, Animal Biology
Ch 11/12 or Ch 13/14, Chemical Principles
Ch 151/161, 152/162, Organic Chemistry *OR* Bc 21, Organic Chemistry and Bc 122, Bio-Chemistry. Bc 161 may be substituted for Ch 152/162 or Bc 122
Ms 26, Calculus
Ps 1a/2a, General Physics
Foreign language at intermediate level

In addition to the above, twenty-two hours of Zoology courses are required, including at least one from each of the following categories. Associated laboratories are required in each case except IDL 119. Evolution may be used to satisfy *only one area requirement.*

I.	Zo 131	Vertebrate Biology
	Zo 133	Comparative Anatomy
	Zo 136	Developmental Biology
	Zo 153	Invertebrate Zoology
	Zo 158	Animal Parasitology
II.	Zo 162	Principles of Genetics
	Zo 165	Evolution
III.	Zo 177	Animal Physiology
	Zo 180	Cell Physiology
	Zo 185	Comparative Animal Physiology
IV.	IDL 119	Ecology
	Zo 165	Evolution

Additional hours to fulfill the 22-hour requirement may be choosen from Zoology courses at the 100 or 200 level, and from the following IDL courses:

IDL 120	General Ecology
IDL 140	Seminar in Quaternary Studies
IDL 201	Biological Oceanography
IDL 208	Anatomy and Classification of Fishes
IDL 211	Larval Biology of Marine Invertebrates
IDL 252	Behavior Genetics

The University of Maine at Orono requires a minimum of a 2.0 in the major. The courses used for this calculation in Zoology are those at the 100 level and above. Students in the class of 1982, and beyond, must meet these requirements; students in earlier classes may elect to meet these requirements.

Students must have a grade point average of 2.0 or better in Zoology courses, including Bio 1 and Zo 4.

Requirements for the Biology Major (B.A.)

The biology major in Arts and Sciences is provided in conjunction with the College of Life Sciences and Agriculture. It is administered by a committee representing the Departments of Biochemistry, Botany, Entomology, and Microbiology in the College of Life Sciences and Agriculture and the Department of Zoology in the College of Arts and Sciences. Two options are available: the student can earn a B.A. by meeting the Arts and Sciences requirements, or a B.S. by meeting the Life Sciences and Agriculture requirements.

The Biology Program permits a student to gain a broad background in the biological sciences. The curriculum offers several program choices leading to career opportunities such as high school teacher, ecologist, food scientist, agricultural scientist, and naturalist. The cur-

riculum is suitable for students wishing the broad basic education required in preparation for graduate study which leads to careers in government, industry, and teaching and research at the university level. Other students can prepare for admission to professional schools of medicine, dentistry, optometry, pharmacy, and other advanced study. For some, a broad education is desired rather than a specific career-oriented program.

All students will take a common freshman year program. Students should consult their academic advisors for particular vocational requirements.

CURRICULUM IN BIOLOGY
(Core Curriculum)

		Credit hours	Minimum degree hours required
A. BIOLOGICAL AND PHYSICAL SCIENCES			
1. Required:			59-60
Ch 11-12 or 13-14	Chemistry	8	
Ms 4, Ms 26	Mathematics	8	
Ps 1a-2a	Physics	8	
Bio 1	Basic Biology	4	
Bt 2	Plant Kingdom	4	
Zo 4	Animal Kingdom	4	
En 26	Entomology	4	
Mb 127	Microbiology	3	
Mb 128	Microbiology Lab	2	
Zo 162	Genetics	4	
Zo 165	Evolution	3	
Bc 122-122L or Bc 133-122L, or Bc 161-161L	Biochemistry	4-5	
IDL 119	Ecology	3	
2. Group Electives:			16-23
Chemistry			
Bc 21 or	Organic Chemistry		
Ch 151-161	Organic Chemistry	4	
Ch 151-161 and Ch 152-162	Organic Chemistry	10	
Taxonomy			
Mb 136, Bt 159, 164, 173, En 140, 153, Zo 131, 153, 158		4	
Physiology			
Bt 153, Mb 153, Zo 177		4-5	
Anatomy			
Bt 135, Zo 133, 136		4	
B. COMMUNICATIONS			3
	Written	3	
C. HUMANITIES AND SOCIAL SCIENCES			15

D. ORIENTATION		0
E. SPECIAL REQUIREMENTS AND OPTIONS		19-27
B.A. DEGREE IN COLLEGE OR ARTS AND SCIENCES*		
a. Upper level courses		12
(Combined with Humanities and Social Sciences in "C" above for a total of 27 hours—minimum of 12 hours in the 27 must be upper level courses)		
Must include 11 hours of Humanities, with Foreign Language through intermediate level, and 11 hours of Social Sciences		
b. Free electives		7-15
OR		
B.S. DEGREE IN COLLEGE OF LIFE SCIENCES AND AGRICULTURE		
a. Communications		3
Oral (SC 3, LSA requirement)	3	
b. Upper level courses		12-15
Advanced biological sciences or related fields		
or		
Minors (Minimum of 15 credit hours)		
- Agricultural Sciences		
- Biology Education		
- Botany		
- Chemistry		
- Computer Science		
- Entomology		
- Food and Nutrition		
- Food Science		
- Mathematics		
- Plant and Soil Sciences		
c. Free electives		1-12
Total		120 hrs

*See College introduction for more detailed description of requirements and options.

SPECIMEN CURRICULUM FOR ZOOLOGY MAJORS (AND FOR PREMEDICAL/PREDENTAL STUDENTS MAJORING IN ZOOLOGY*)

Freshman Year

	FALL SEMESTER	Credit Hours		SPRING SEMESTER	Credit Hours
Eh 1	Freshman Comp.	3	Zo 4	Animal Biology	4
Ms 26	Anal. Geom. & Cal.	4		Inter. Foreign Lang.	3
Bio 1	General Biology	4		Humanities-Social Science	7
	Inter. Foreign Lang.	3			
		14			14

Sophomore Year

Ch 11 or 13	Chemical Prin.	4	Ch 12 or 14	Chem. Prin.	4
Zo 133	Comp. Anatomy		Zo 136	Devel. Biology	4
	or	4		Humanities-Social Science	6
Zo 153	Invertebrate Zoology				
	Hum.-Social Science	3			
	Elective	4			
		15			14

Junior Year

Ch 151	Organic Chem.	3	Ch 152	Organic Chem.	3
Ch 161	Organic Chem. Lab	2	Ch 162	Organic Chem. Lab	2
Ps 1a	Gen. Physics	4	Ps 2a	General Physics	4
Zo 177	Animal Physiology	4	Zo 162	Prin. of Genetics	4
	Hum.-Social Science	3		Hum.-Social Science	3
		16			16

Senior Year

Zo 151	Histology	4	Zo 180	Cell Physiology	4
	Hum.-Social Science	3		Zoology Elective	4
	Elective	8		Hum.-Social Science	3
				Elective	4
		15			15

*See Index for premedical programs.

Students applying to the University of Maine at Orono duiring the fall of 1980, the spring of 1981, and thereafter should indicate an interest in pre-medical technology. The curriculum will be the same as stated below for the freshman and sophomore years. However, during the spring semester of the sophomore year students will apply for admission to the Medical Technology Program through the Zoology Department.

SPECIMEN CURRICULUM FOR MEDICAL TECHNOLOGY

Freshman Year

	FALL SEMESTER			SPRING SEMESTER	
†Ch 11	Gen. Chem.	4	†Ch 12	General Chemistry	4
	or			or	
Ch 13	Chem. Princ.	4	Ch 14	Chem. Princ.	4
†Bio 1	Basic Biology	4	†Zo 7	Med. Tech. Orien.	1
†Ms 22	Alg. & Trig.	4	†Zo 8	Anat. & Phys.	4
	or		†Ps 6	*Essentials of Physics	5
Ms 26	Calculus	4		Elective Basic Arts & Science requirements	
	Elective Basic Arts & Science requirements			or	
	or		Eh 1	Freshman Comp.	3
Eh 1	Freshman Comp.	3			
		15			17

*only for freshman entering the class of 1984. Ps 1a & Ps 2a will be required thereafter.

Sophomore Year

†Bc 21	Organic Chem.	4	†Bc 122	Bioch.	4
†Mb 127			†	Intro. to Immunology	3
& 128	Gen. Microbiology	5	†Zo 158	**Parasitology	4
	Elective Basic Arts & Science requirements	6-7		Elective Basic Arts & Science requirements	6
		15-16			17

**Zo 158 will be an elective for the class entering in 1981.

Junior Year

†Zo 151	Histology	4	†Ch 121	Intro. to Clin.	
†Mb 152	Pathogenic Bact. Serology	4		Lab. Methods	3
†Zo 127	Biomedical Instrumentation	3	†Zo 192	Intro. to Human Path.	3

Elective Basic Arts & Science requirements	6	†Ch 140	Quant. Anal.	4
			Elective Basic Arts & Science requirements	6
	17			16

*****Senior Year**

Twelve months in either the Eastern Maine Medical Center (EMMC), Bangor, Maine; or the Maine Medical Center (MMC), Portland, Maine. A student must have a G.P.A. of 2.5 overall and 2.5 in the sciences to be considered for admission by the hospital progams.

Year's Curriculum

Zo 122 Clinical Hematology	7 credits
Zo 123 Clinical Microbiology	7 credits
Zo 124 Clinical Immunohematology	7 credits
Zo 125 Clinical Chemistry	9 credits
Zo 126 Clinical Microscopy	2 credits
Total	32 credits

*** Students desiring to spend their senior year at the University of Maine may do so by electing the proper advanced courses along with a departmental major other than medical technology. Such students are candidates for the bachelor's degree in the major fields of their choice. They are eligible for the certificate of M.T. (ASCP) only upon completion of a fifth year of training in an accredited hospital training program which the students would have to obtain on their own.

† These courses or their equivalents, are required for the major in medical technology.

Courses in Zoology (Zo)

Bio 1. Basic Biology—A one-semester introduction to fundamental concepts of structure and function in living systems, both plant and animal. Offered for 4 credits but more or less credit can be obtained by special arrangement. Lectures three times a week; laboratories arranged. Audio tapes available as study aid; study center staffed by instructors. Lec 2, Lab 4, Cr 4.

1. Principles of Biology—A non-laboratory treatment of the basic principles of biology, including such topics as ecology, evolution, genetics, and cell theory. Particular emphasis on application of biological principles to problems of modern society. Lec 3, Cr 3.

4. Animal Biology—Second semester course includes an introduction to vertebrate and invertebrate structures and functions (emphasizing basic physiological principles), ecology, systematics, and evolution. Lec 3, Lab 3, Cr 4.

7. Orientation in Medical Technology—An introduction to the profession of medical technology for second-semester freshman medical technology students. Required. Lec 1, Cr 1.

8. Anatomy and Physiology—The general principles of animal life. Emphasis on the structure and functions of the human body. Prerequisite: Bio 1. Students completing Zo 4 can not take Zo 8. Lec 2, Rec 1, Lab 2, Cr 4. (Not recommended for nursing students.)

10. Anatomy and Physiology—Prerequisite for admission to Nursing Program. Lec 3, Lab 4, Cr 5.

IDL 19. (Fy, Bt, Zo) Introduction to Ecology—Emphasizing ecological principles and their relationships to the natural environment and man. Not open to majors in biological sciences or resource management areas. Lec 3, Cr 3.

95. Zoology Professional Experiences—Students may be engaged in research, clinical determinations, field studies or allied activities with medical professionals, hospitals, laboratories, state agencies, and other organizations approved by the department. May be repeated for credit up to total of 8 credit hours.

100. Drug Use and Abuse—An introduction to drugs of importance in contemporary society. Emphasis on those of biological, medical, and social importance, survey of principles of administration, dose response curves, physiological and pharmacological actions, and toxicity. Prerequisite: Zo 4, 8, 10. Lec 3, Cr 3.

IDL 119. General Ecology—Course in ecological principles for the science major. Major topics include environmental factors, population ecology, community ecology and ecosystem energetics. Prerequisite: one year college chemistry; one year college biological science. Lec 3, Cr 3.

IDL 120. Ecology Laboratory and Field Course—Ecosystems studied in the field, and ecologic experimentation in the laboratory, to illustrate ecologic principles and provide technical experience. Saturday field trips. Prerequisites: IDL 119 or equivalent. Lab and field 6. Cr 3.

121. Introduction to Clinical Laboratory Methods—An introduction to basic theory and methods in clinical hematology and urinalysis. Required for medical technology students. Prerequisite: Zo 4 or 10, Ch 11/12, Ch 140. Lec 1, Lab 4, Cr 3.

122. Clinical Hematology—A comprehensive study of the principles, methodology and pathological states in hematology. Lectures and laboratory practice. (EMMC, CMGH, MMC) Cr 7.

123. Clinical Microbiology—A comprehensive study of the principles and techniques of diagnostic microbiology and parasitology. Lectures and laboratory practice. (EMMC, CMGH, MMC). Cr 7.

124. Clinical Immunohematology—Lectures and laboratory practice in the fundamental techniques used in blood grouping and cross-matching proceeding to advanced studies of human blood groups, theory and practice in special problems, and advanced technique. (EMMC, CMGH, MMC). Cr 7.

125. Clinical Chemistry—Lectures and laboratory exercises in basic techniques of clinical chemistry proceeding to advanced theories and methodology and including theory and technique of immunochemistry. (EMMC, CMGH, MMC). Cr 9.

126. Clinical Microscopy—Lectures and laboratory practice in the microscopical examination of urine and body fluids. (EMMC, CMGH, MMC). Cr 2.

127. Biomedical Instrumentation—Review of electricity, electronics, and colorimetry; introduction to use and care of basic clinical laboratory instruments. Priority given medical technology students. Prerequisites: Ps 3 or Ps 1a, 2a, or equivalent. Lec 2, Lab 3, Cr 3.

131/132. Vertebrate Biology—An introduction to the classes of vertebrates; their characteristics, evolution, physiology, ecology, and behavior. Emphasis on adaptive strategies in the environment. Prerequisite: Zo 4; Zo 131 is prerequisite for Zo 132. Lec 3, Cr 3.

131L/132L. Vertebrate Biology Laboratory—Taxonomy of regional vertebrate fauna; structure and function of representatives of vertebrate classes. Taxonomy of local vertebrates covered in 131L; topics in anatomy, physiology, and behavior in 132L. Prerequisite: Zo 131 concurrently with Zo 131L; Zo 132 concurrently with Zo 132L. Lab 2, Cr 1.

133. Comparative Anatomy—The structure, origin, and history of the vertebrate organ-systems. Prerequisite: Zo 4 or permission of instructor. Lec 2, Lab 4, Cr 4.

134. Biological Ultrastructure—The ultrastructure of the cells of multicellular organisms, protozoa, bacteria and viruses. Prerequisite: Zo 151 and Biochemistry. Lec 3, Cr 3.

136. Developmental Biology—The transformation of the fertilized egg into a new adult individual: the concepts of growth and development of organisms. Prerequisite: Zo 4, Lec 2, Lab 4, Cr 4.

138. Morphogenesis and Differentiation—Analysis of interacting systems in development: study of regulation of morphogenesis and differentiation at the organ, tissue and cellular levels, with emphasis on experimental approach towards problems in development. Prerequisites: Zo 136 or permission of instructor. Lec 3, Cr 3.

IDL 140. (GY, ay, bt, s, zo) Seminar in Quaternary Studies—A multi-disciplinary seminar concerned with selected areas of study—physical, biological and anthropological—related to the Quaternary Period. Subject areas will vary each semester. Can be taken more than once for credit. Prerequisite: consent of instructor. Lec 2, Cr 2.

151. Histology—Microscopic anatomy of animal tissues. Prerequisite: Zo 4. Lec 2, Lab 4, Cr 4.

152. Animal Microtechnique—Histological and histochemical techniques for the preparation of animal tissues and cells for microscopic study. Prerequisite: Zo 4. Lec 1, Lab 4, Cr 3.

153. Invertebrate Zoology—The morphology, ecology, life histories and phylogenetic relationships of invertebrates exclusive of insects. Prerequisite: Zo 4. Lec 2, Lab 4, Cr 4.

155. Biology of Behavior—Mechanisms of animal behavior, stressing how behavior adapts animals to their environments. Prerequisite: Zo 4 or equivalent. Lec 3, Cr 3.

155L. Biology of Behavior Laboratory—Prerequisite: Zo 155 or concurrently. Lab 4, Cr 2.

158. Animal Parasitology—The life histories, economic importance, methods of control, host necropsy and the preparation of parasites. Prerequisite: Zo 4. Lec 2, Cr 2.

158L. Animal Parasitology Laboratory—Prerequisite: Zo 158 or concurrently. Lab 4, Cr 2.

162. Principles of Genetics—The nature of hereditary factors and the mechanisms by which they are transmitted and expressed. Prerequisite: Bio 1 and junior standing. Lec 3, Lab 2, Cr 4.

165. Evolution—The origin and development of evolutionary theory and the mechanisms which bring about the genetic differentiation of groups of organisms. Prerequisite: Bio 1. Lec 3, Cr 3.

IDL 170. (OC, zo) Introduction to Oceanography—Basic concepts in physical, geological, chemical, and biological oceanography. Prerequisite: one year each of mathematics, physics, chemistry, and biology, or permission of instructor. Lec 3, Cr 3. Seniors and graduates.

171. Fishery Biology—Introduction to theory and practice of contemporary fishery biology emphasizing ecology, life history, fish population sampling and manipulation, human factors and multiple use concepts. Prerequisites: Zo 131, IDL 119 or Fy 19. Recommended: Fy 4 or Ms 19. Lec 3, Cr 3.

171L. Fishery Biology Laboratory—Field and laboratory exercises providing experience with techniques commonly employed in fishery biology. Data interpretation and report preparation. Two Saturday field trips. Offered spring and fall semesters. Fall emphasizes medical aspects of vertebrate physiology; spring, comparative vertebrate physiology. Prerequisite: Zo 171 or concurrently. Lab 2, Cr 1.

177. Animal Physiology—Physiological processess in vertebrates with emphasis on the integration of organ systems. Offered spring and fall semesters. Fall emphasizes medical aspects of vertebrate physiology; spring, comparative vertebrate physiology. Prerequisites: Bio 1/Zo 4; one year of chemistry and junior standing. Lec 2, Lab 4, Cr 4.

179. Experimental Endocrinology—A comprehensive survey of the vertebrate endocrine glands and their functional relationships. The experimental and comparative approach emphasized. Prerequisite: Zo 177 and Organic Chemistry. Lec 2, Lab 4, Cr 4.

180. Cell Physiology—A physiochemical analysis of cell function and structure. Special emphasis on mechanisms of cellular function common to most living organisms, particularly their implications in the physiology of multicellular animals. Associated laboratory emphasizes experimental techniques employed in modern cell physiology. Prerequisite: Zo 4, Organic Chemistry or Biochemistry. Lec 3, Lab 2, Cr 4.

185. Comparative Animal Physiology—A comparative approach to the functional adaptations of animals to diverse environments, with emphasis on underlying physiological and biochemical mechanisms. Prerequisite: Zo 4, year of chemistry, and junior standing. Lec 3, Lab 2, Cr 4.

187.188. Problems in Zoology—Open to juniors and seniors who have special interest and qualifications in some branch of zoology. Admission by permission of department chairman. Cr Ar.

192. Introduction to Human Pathology—An introduction to the study of diseases. First portion covers general pathologic principles and how they relate to human disease states: second portion deals with specific organ systems and the diseases affecting them. Primarily for medical technology students. Prerequisites: Zo 10, Zo 151, Mb 127-128, 152, their equivalents or permission of instructor. Lec 3, Cr 3.

GRADUATE STUDY IN ZOOLOGY

The department offers work leading to the degrees of master of science and doctor of philosophy, the general requirements for which are listed under Graduate Study.

A reading knowledge of an appropriate foreign language is a requirement for the Ph.D. degree. In the major field, all courses numbered 200 or over are given primarily for graduate

credit. All courses numbered 100 to 199 may be taken for graduate credit, with prior approval of the student's advisory committee. Students may be required to take, without graduate credit, certain undergraduate courses which they lack.

Specific fields of interest for thesis subjects include cytology, ecology, experimental embryology, fishery biology, general physiology, genetics, and invertebrate zoology.

Graduate Courses in Zoology

IDL 201. (Oc, Zo) Biological Oceanography—The study of marine organisms and their interrelationships with the chemical, geological and physical aspects of their environment. Prerequisite: one year of general biology and permission of instructor. Lec 3, Cr 3.

IDL 208. (OC, Zo) Anatomy and Classification of Fishes—An introduction to the classification of fishes, including fossil forms, and a discussion of those aspects of fish anatomy of most value in systematics. Prerequisite: Zo 133 and/or 136, or permission of instructor. Lec 3, Lab 4, Cr 5.

IDL 210. (Oc, Zo) Marine Invertebrate Zoology—Systematics and adaptive-functional morphology of free-living marine invertebrates, excluding protozoans, with laboratory emphasis on studies of living material from the local fauna. Numerous field trips required. At Darling Center, summers only. Prerequisite: Zo 153 or equivalent. Lec 2, Lab 6, Cr 5.

IDL 211. (Oc, Zo) Larval Biology of Marine Invertebrates—Life-histories of free-living marine invertebrates, excluding protozoans, with emphasis on development, behavior, and ecology of larval forms. Laboratory studies stress methods of procuring, handling, and culturing larvae for descriptive or experimental purposes. Numerous field trips required. Summers only, at The Darling Center. Prerequisite: Zo 153 or equivalent. Lec 2, Lab 6, Cr 5.

220. Population Biology—A discussion of advanced topics in the ecology and genetics of species and populations: population genetics; population dynamics; population structure; selection; speciation. Prerequisite: IDL 119 (or equivalent) and Zo 162 or Zo 165, or permission. Lec 3, Cr 3.

222. Community Ecology—An advanced discussion of the organization of biological communities: community structure, stratification, and patterns; niche division and species diversity; competition; predation; community classification and description; biogeography of communities; succession and climax. Prerequisites: IDL 119 or equivalent. Lec 3, Cr 3.

231. Physiology of Fishes—Analysis of the functional biology of fishes; emphasis on the mechanistic bases of physiological functions and their adaptive significance in a variety of environmental situations. Prerequisites: Zo 177 or equivalent, or permission. Lec 3, Cr 3.

231L. Physiology of Fishes Laboratory—Independent student projects involving field collection of fishes and laboratory analysis of their physiological function. Prerequisite: Zo 231 or concurrently *and* permission. Lab 4, Cr 2.

232. Ichthyology—The characteristics, functional anatomy, behavior and ecology of fishes. Lectures, laboratory study, and field trips. Prerequisite: permission of instructor. Lec 2, Lab 4, Cr 4.

233. Mammalogy—Characteristics, functional anatomy, physiology, behavior and ecology of mammals. Lectures, laboratory study and field trips. Prerequisite: Zo 132, and an ecology course, or permission. Lec 3, Lab 3, Cr 4.

234. Avian Biology and Ecology—Advanced discussion of the characteristics, functional morphology, behavior, evolution, biogeography, and ecology of birds. Lectures, laboratory study, and an independent field project. Prerequisites: Zo 132, and an ecology course, or permission. Lec 3, Lab 3, Cr 4.

Zo 238. Experimental Embryology—Analysis of the components of development including growth, morphogenesis, and differentiation. Prerequisites: Zo 133, Zo 136, or permission of instructor. May be taken concurrently with Zo 238L. Lec 2, Cr 3.

238L. Experimental Embryology Laboratory—Instruction in experimental techniques used in the study of developmental systems. Coordinated with Zo 238 lectures. Prerequisites: Zo 133, 136, 238 or concurrently, and permission of instructor. Zo 152 recommended. Lab 4, Cr 2.

240. Seminar in Evolutionary Ecology—Seminar series covering the theoretical and applied aspects of ecological and evolutionary principles. Prerequisites: permission of instructor. Cr Ar.

242. Electron Microscopy—Techniques of electron microscopy, particularly those that apply to biological material. Principles of design and operation of transmission electron microscopes and scanning electron microscopes. Prerequisite: permission of instructor. Lec 2, Lab 6, Cr 5.

250. Genetics of Populations—An introduction to the study of the genetic structure of populations and the factors which affect the genetic composition of populations. Prerequisites: Zo 162 and Ms 26. Lec 3, Lab 2, Cr 4.

IDL 252. (Zo, Py). Behavior Genetics—Genetic analysis of behavior in several organisms including *Drosophila, Mus* and man. Current literature on behavioral mutants and polygenic behavior discussed in depth. Offered in spring of odd-numbered years. Prerequisite: Zo 162 and Ms 19 or equivalent. Lec 2, Rec 1, Cr 3.

253. Advanced Human Genetics and Metabolism—An examination of the development of human metabolic and physiologic functions with primary consideration of genetic mechanisms and regulatory events including chromosomal and Mendelian inheritance, multi-factorial traits, and a comprehensive analysis of biochemical lesions involved in inherited metabolic disease. Prerequisite: Zo 162, Bc 161, Bio 51 or equivalents. Cr 3.

IDL 263. (BT, oc, zo) Marine Benthic Ecology—An advanced course emphasizing ecological studies on benthic intertidal and subtidal marine organisms. Limiting factors, distributions, zonation, biotic interactions, food webs, succession, productivity, energy, community structure and species diversity. Prerequisite: a course in ecology. Lec 2, Rec 1, Cr 3.

270. Advanced Topics in Aquatic Biology—In-depth study of selected topics in freshwater or marine biology. Students prepare critical papers and organize discussion. May be repeated for credit. Prerequisite: permission of instructor. Cr 2.

273. Fisheries Science—Field and laboratory exercises in the application of applied scientific techniques to the study of fish populations. Techniques for population estimation, growth rate determinations, fish production and propagation in freshwater and marine environments. Prerequisites: Ms 19 or Fy 4 and Zo 171, or permission. Lec 1. Lab 3. Cr 2.

286. Physiological Ecology—The functions and adaptive responses of animals to environmental variables. Emphasis on marine and estuarine invertebrates. Extensive reading in original literature required. Prerequisite: Zo 177, 178, or Zo 185. Lec 3, Cr 3.

286L. Physiological Ecology Laboratory—Independent student projects involving field observation and collection, and laboratory analysis of animal responses to marine environmental factors. Prerequisite: Zo 286 or concurrently *and* permission of instructor. Lab 4, Cr 2.

292. Functional Anatomy of Marine Invertebrates—Detailed studies of the functional anatomy and morphology of selected groups of marine invertebrates, particularly echinoderms. Structures of taxonomic importance and feeding and reproductive biology emphasized. One required Saturday or Sunday field trip. Prerequisite: Zo 153 or equivalent. Lec 1, Lab 4, Cr 3.

295. Zoology Professional Experience—Students will work with medical professionals, hospitals, laboratories, state agencies and other organizations approved for this purpose by the Department of Zoology. Students may be engaged in research, clinical determinations, field studies or allied activities. Prerequisites: Cr 0-4. May be repeated for credit up to a total of 8 credit hours.

IDL 340. (BT, en, fy, zo) Seminar in Ecology—Lec 1, Cr 1.

354. Advanced Genetics—Lec 3, Cr 3.

357. Population Dynamics—Lec 2, Cr 2.

360. Multivariate Analysis in Zoology—Lec 2, Lab 2, Cr 3.

381. Experimental Physiology—Lec 2, Lab 2, Cr 3.

384. Advanced Cell Physiology—Lec 2, Cr 2.

391.392. Problems in Zoology—Cr Ar.

393.394. Problems in Biological Oceanography—Cr Ar.

399. Graduate Thesis—Cr Ar.

Bangor Community College

Charles R. MacRoy, Dean

On July 1, 1974 the University of Maine at Bangor was officially named the Bangor Community College of the University of Maine at Orono. Although Bangor Community College, with its 160-acre campus, is located in Bangor, its relationship to Orono is the same as that of the other five colleges on the Orono campus.

It is the second in the system of community colleges in the State of Maine. Its primary goal is to meet Maine's needs in both educational and career areas by offering a variety of two-year associate degree, one-year certificate, and other short-term programs. These programs are designed for persons of all ages who wish to increase their general knowledge or prepare for careers.

Bangor Community College maintains its own admissions office with an open admissions policy to anyone who applies, with the exception of some of the specialized programs which require a more selective basis for admission. The Liberal Studies, Law Enforcement, Dental Hygiene, Dental Assisting, and Human Services programs are designed for persons of all ages who wish to increase their general knowledge or prepare for a career. The program in Developmental Studies is provided for those individuals who may feel their educational background is inadequate, but have a strong desire for a college education.

With its own administration, Bangor Community College also has classroom buildings, a library, dormitories, gymnasium, student union, theater, and dining facilities. Intercollegiate sports include baseball and basketball in addition to many intramural sports. The student body elects its own student senate and has a separate campus newspaper and student activities board.

Two-year Associate of Science degrees are offered in:

- Dental Hygiene
- Human Services (multiple option in Chemical Addiction Counseling, Child Mental Health, Developmental Disabilities, Gerontology, and Mental Health)
- Law Enforcement

Two-year Associate of Arts degrees are offered in:

- Liberal Studies

A one-year certificate program in Law Enforcement is available for men and women who are usually employed at the time of application in a public law enforcement agency. Most courses in this program are offered at night.

A three-semester certificate program in Dental Assisting is available for men and women. Students gain practical experience from clinical and laboratory sessions and through assignments to private practice, dental offices, and community and hospital dental clinics.

ADMISSION

The open admissions policy offers access to higher education not only to the high school graduate who has taken college prep courses, but to the older adult, the veteran, the holder of a high school equivalency certificate, and the non-college prep student.

The Admissions Counseling Center, in cooperation with the Development Studies faculty, conducts Pre-Admissions Conferences (PACS) throughout the year. These are small group sessions made up of applicants for the various programs. During these conferences, an evaluation is made of each candidate's academic background and potential, together with an assessment of his or her career interests. Following each conference, applicants are notified concerning their admission status.

For additional information on Bangor Community College contact:

Director of Admissions
Bangor Community College
Admissions Building
Bangor, Maine 04401
Telephone: 207-947-6521

ADVANCED PLACEMENT

In certain subjects, candidates who have completed advanced work in secondary schools or have had training and/or experience in certain professional or semi-professional fields, may apply for advanced placement and credit at Bangor Community College. Candidates interested in advanced placement and credit may take the College Level Examination Program (CLEP) tests, administered by the College Entrance Examination Board. The Office of Testing and Research at UMO has established a CLEP Testing Center in Wingate Hall. Inquiries on procedure should be directed to this office.

Duplicate credit may not be granted. For example, credit may not be granted for passing an examination in a field in which a student has already taken the equivalent course or a more advanced course. The examination passed, the score and the credit granted by the College Dean are entered by the Registrar on the student's permanent record. Each case will be considered individually on its own merits.

DEVELOPMENTAL STUDIES

Associate Professors Pinette, Smith; Assistant Professor Schonberger

These courses are closely related to the "Open Door" admissions policy. Rather than refusing admission to applicants with poor skills in reading, English, or mathematics, we are able to offer concentrated guided work in the area(s) of weakness. The taking of one or more of the courses may be a condition of admission.

The number of students in the developmental studies classes rarely exceeds 15. Special materials and equipment make it possible to individualize instruction, which allows each student to progress at his or her own rate.

Usually one semester of developmental course work will enable the student to improve his or her skills sufficiently to handle college level work.

Although one or more developmental courses may be a condition of admission, it should be noted that a limited number of credits earned in developmental studies is acceptable for degree credit in four of the six programs now operating.

It should be understood that credits in developmental studies courses will *not* apply toward meeting degree requirements in the Liberal Studies program.

Those students needing extensive developmental work may need to spend additional semesters at the college in order to complete degree requirements.

Developmental Studies

1 DSR Reading Laboratory—Emphasis on reading rate, flexibility, vocabulary, comprehension and study skills. Less intensive than 3 DSR. Cr 1. Pass/Fail.

3 DSR Developmental Reading—To help the student deficient in reading and study skills. Individualized instruction with emphasis on reading comprehension, rate and flexibility, vocabulary, and study techniques. Cr 3.

3 DSE Developmental English—Emphasis on improving fundamental skills in grammar, punctuation, capitalization, sentence development and paragraph development. Once the student has mastered basic writing skills, he will write brief papers appropriate to his area of specialization. Cr 3.

2 DSM Developmental Mathematics—Computation with positive and negative whole numbers, fractions and decimals, and applications of mathematics to practical problems are stressed. Cr 3. Pass/Fail.

3 DSM Algebra—Solving equations, factoring, graphing, applications of algebra to practical problems. Prerequisite: competence in basic arithmetic. Cr 3.

99 DSS Developmental Studies Skills—Provides the student opportunities to improve specific skills in such areas as reading, writing, math and study habits. It is principally designed to extend or to integrate the instruction offered in the other developmental studies courses. Prerequisite: Permission of Instructor. Cr 1-3. Pass/Fail.

1 DSA Individual Mathematics Preparation—Designed primarily for those who need assistance in gaining specific math skills normally required of students interested in pursuing the following career areas: physical sciences, biological sciences, allied health, agriculture, business, clerical trades, and general trades (constructions, electrical and electronics, drafting, etc.) Weakness in math competences required in specific career goals will be determined, and these deficiencies will be incorporated into an individualized program of study. Cr 1-3.

2 DSA Fundamentals of General Chemistry—Designed primarily for those who need assistance in gaining specific chemistry competencies normally required of students interested in pursuing the following careers: physical sciences, biological sciences, allied health, engineering and agriculture. Weakness in chemistry competencies required in specific career goals will be determined, and these deficiencies will be incorporated into an individualized program of study. Cr 1-3.

3 DSA Fundamentals of General Physics—Designed primarily for those who need assistance in gaining specific physics competencies normally required of students interested in pursuing the following careers: physical sciences, biological sciences, allied health, engineering and agriculture. Weakness in physics competencies required in specific career goals into an individualized program of study. Cr 1-3.

LAW ENFORCEMENT
ASSOCIATE OF SCIENCE DEGREE PROGRAM

Professor Foley (Chairperson); Associate Professors Chesley, Jordan

A dedicated, highly trained and well-educated law enforcement officer is essential to the functioning of a democratic society. He plays a vital role in the social order of the community and the welfare of the individual. A profession in law enforcement can offer financial security, retirement pensions and other fringe benefits, stimulating job assignments, and the satisfactions of public service.

Law enforcement agencies today recognize the need for college-trained personnel. Two years of college are being required in many departments. Educational qualifications extending beyond two years are commonplace in the more selective agencies. Opportunties for employment far exceed the supply of trained personnel and will for several years to come. Vacancies exist at every level of state and federal government. Also, many positions are available in private security firms for men and women interested in and qualified for law enforcement.

The Law Enforcement Program provides a balanced schedule of liberal arts courses and professional technical courses for present and potential personnel in the field of law enforcement. It is designed to meet the needs of both the two-year associate degree student and the student who desires to transfer to a baccalaureate program.

The requirement for admission is a high school diploma or an equivalency certificate. Certain remedial courses may be required in appropriate cases. These courses may be taken along with the regular program courses. The deadline for making application is July 31st.

Upon completion of 60 degree hours with a minimum grade point average of 2.0, the student will be awarded the Associate of Science Degree in Law Enforcement.

ASSOCIATE OF SCIENCE DEGREE IN LAW ENFORCEMENT
SPECIMEN PROGRAM

First Year

FIRST SEMESTER		
3 ENG	Crit. Written Express.	3
7 PSY	Intro. to Psychology	3
1 LES	Intro. to Law Enforcement	3
2 LES	Police Operations	3
4 LES	Criminal Law	3
	TOTAL HOURS	15
SECOND SEMESTER		
4 ENG	Speech	3
8 SOC	Intro. to Soc.	3
3 LES	Police Admin.	3
8 LES	Intro. to Criminalistics	3
12 LES	Pol. Comm, Rec. and Rep. Wrtg.	3
	TOTAL HOURS	15
THIRD SEMESTER		
5 LES	Criminal Investigation	3
5 POL	State and Local Govt.	3
LES elective		3

General Education Elective		3
Free Elective		3
	TOTAL HOURS	15

FOURTH SEMESTER

14 LES	Const. Law for Police	3
LES Elective		3
General Education Elective		3
Free Elective		3
Free Elective		3
	TOTAL HOURS	15

CERTIFICATE PROGRAM IN LAW ENFORCEMENT

Objective — To provide the employed adult an opportunity to pursue study in the field of law enforcement. This program will allow the veteran law enforcement officer to improve his career potential even though he may not have the academic background or desire to undertake the Associate Degree Program.

Admission to the Program — The applicant need have no particular educational attainment.

CERTIFICATE IN LAW ENFORCEMENT REQUIREMENTS

FIRST SEMESTER

		CREDIT HOURS
2 LES	Police Operations	3
4 LES	Criminal Law	3
8 LES	Intro. to Criminalistics	3
12 LES	Pol. Rec., Comm., and Rep. Writg.	3
LES Elective		3
	TOTAL HOURS	15

SECOND SEMESTER

5 LES	Criminal Investigation	3
3 LES	Police Administration	3
7 PSY	Intro. to Psychology	3
8 SOC	Intro. to Sociology	3
5 POL	State and Local Government	3
	TOTAL HOURS	15
	GRAND TOTAL	30 Hours

Law Enforcement

1 LES Introduction to Law Enforcement—History, development, and philosophy of law enforcement in democratic society; introduction to agencies involved in the administration of criminal justice; career orientation. Cr 3.

2 LES Police Operations—Line activities of law enforcement agencies with emphasis on the patrol function and the prevention of crime; includes traffic, investigative, juvenile, vice, and other specialized operational units. Cr 3.

3 LES Police Administration—Principles of organization and management as applied to law enforcement agencies; introduction to concepts of organizational behavior. Cr 3.

4 LES Criminal Law—Local, state and federal laws; their development, application, and enforcement. Cr 3.

5 LES Criminal Investigation—Fundamentals of criminal investigation; theory and history; crime scene to courtroom with emphasis on techniques appropriate to specific crimes. Prerequisite: 8 LES and 4 LES. Cr 3.

6 LES Police Role in Crime and Delinquency—Introduction to deviant behavior and current criminological theories with emphasis on police applications; crime prevention and the phenomena of crime. Cr 3.

8 LES Introduction to Criminalistics—Physical evidence, collection, identification, prevention, and transportation; crime laboratory capability and limitations; examination of demonstration of laboratory criminalistics to the extent supported by existing or available facilities. Prerequisite: 2 LES and 4 LES. Cr 3.

10 LES Criminal Evidence and Court Procedure—Criminal evidence for police, types of evidence; criminal procedure in various courts; arrest, search, and seizure, collection of evidence, discretion, and related topics. Prerequisite: 4 LES. Cr 3.

12 LES Police Communications, Records and Report Writing—To provide the students with a general understanding of police records and communications systems currently in use or under development. To allow each student to improve his skills in written communication with particular emphasis on the reporting of police matters. Cr 3.

14 LES Constitutional Law for Police Officers—The provisions of the Constitution which directly relate to the powers of both federal and state law enforcement and the limitations imposed by such provisions on law enforcement officers and prosecutors. Cr 3.

15 LES Principles of Supervision and Management—An introduction to the supervision process and the techniques for becoming a more efficient supervisor. Attempts to take the philosophy of supervision and translate it into the everyday practices and methods of the police supervisor. Special attention to the supervisor's responsibility for training, both in-service and roll-call. Prerequisite: 3 LES. Cr 3.

16 LES The Juvenile Justice System—This course will approach the concept of juvenile justice by interrelating the roles of the judicial system and law enforcement agencies. Cr 3.

17 LES Traffic Accident Investigation—To enable personnel with police traffic service responsibilities to acquire knowledge and skill requisite to successful performance of duty and responsibility when conducting traffic accident investigations, implementing traffic law enforcement activities, planning and supervising police traffic service functions and accident prevention programs. Cr 3.

18 LES Intermediate Criminalistics—An advanced approach to physical evidence. Collection, identification, preservation, and transportation, crime laboratory capability and limitations; examination of physical evidence within resources of the investigation and demonstration of laboratory criminalistics to the extent supported by existing or available facilities. Prerequisite: 5 LES and 8 LES. Cr 3.

19 LES Communications Skills for Law Enforcement—Designed to expand and refine communication skills directly related to the law enforcement field. Techniques to improve both written and oral communication. It is strongly recommended that students enrolling in this course first fulfill their English and Speech requirements. Cr 3.

20 LES Business and Industrial Security—An introduction to business and industrial security. Emphasis on appropriate countermeasures to combat increases in business and industrial crime. Increased usage of computers in business and industry requires that security personnel be made aware of special protection that is needed in this area. Cr 3.

21 LES Police Internship—Allows the pre-service student an insight into the working operations of a law enforcement agency through participation in the day-to-day activities of the agency, increases his ability to relate to the classroom instruction and his career field. The student must work a minimum of 20 hours per week for the participating agency, and must complete and submit one case study or research project relating to his experience with that agency. Prerequisite: completion of at least 30 hours in the Law Enforcement Program. Must be a preservice student and have achieved a 3.0 grade point average in the previous semester. Cr 3.

22 LES Women in Crime: The Female as Victim and as Offender—Crimes pertinent to women, both in their role as offender and as victim. Variations in female criminality by race and social class. Treatment of women by the criminal justice system. What women can do to prevent victimization. Cr 3.

24 LES Consumer Fraud and White Collar Crime—The development, philosophy and general principles of consumer fraud and white collar crime, with emphasis on identification as well as the development of appropriate investigatory techniques. Cr 3.

34 LES Legal Rights of Women—A survey of the legal status of women as individuals in their interrelations with others such as family in the context of the subject matter. Cr 3.

99 LES Directed Individual Study in Law Enforcement—This course is designed to offer those students with special interests in the law enforcement field an opportunity to undertake study in specialized areas when regular course offerings fail to cover such areas. Prerequisite: permission. Cr 3-6.

LIBERAL STUDIES DIVISION

Associate of Arts Degree

Associate Professor DeFroscia (Chairperson)

The Liberal Studies Program offers every citizen access to two years of high quality college education in the best liberal arts tradition. This program endeavors to provide a rich foundation in the arts, humanities and sciences.

Students applying for the Liberal Studies Program who need special services such as counseling and basic skills instruction in reading, writing and math will be provided such services.

Admission—Candidates for admission must have a high school diploma or its equivalent. Exceptions may be made in rare cases by the Chairman of the Admission Policy Committee. It is strongly recommended that applicants complete the College Entrance Examination Board Scholastic Aptitude Test (SAT). In the event that this is not written, the School & College Ability Test will be administered by the Admissions Office at Bangor Community College. Further testing may be required in the areas of reading, writing and mathematics. The deadline for making fall application is July 31.

If the available data predicts academic success, the applicant will receive unconditional admission to the Liberal Studies Program. However, if a student shows significant weaknesses in basic skills, he or she will receive conditional admission to the program. This student will receive recommendations, made on a semester basis, as to the number, type (liberal, general or developmental) and sequence of courses that must be taken. If such a student applies to the Liberal Studies Admissions Policy Committee for unconditional acceptance into the program, and if the Committee does not grant the student's petition but recommends instead that the student take additional work in basic academic skills, the student may again apply for unconditional admission to the program the following semester.

Transfer—For those who wish to continue their college education towards a baccalaureate degree, Liberal Studies courses are transferable to appropriate baccalaureate programs, and students who successfully gain admission to such programs would normally enter as juniors.

Academic Progress—Students in the Liberal Studies Program will be expected to maintain the same academic level of standing as is currently in effect in other associate degree programs offered by various colleges or divisions of the University.

Degree—Upon successful completion of this program, the student will be awarded the Associate of Arts in Liberal Studies.

Degree Requirements—Students shall complete a minimum of 60 credit hours of study for the Associate of Arts in Liberal Studies. Of these 60 credits, a minimum of 45 *must* be earned in Liberal Studies courses. Students transferring from other colleges must complete 15 credit hours at Bangor Community College and meet all other program requirements. A minimum grade point average of 2.0 is required for graduation.

ASSOCIATE OF ARTS IN LIBERAL STUDIES
SPECIMEN PROGRAM*
FIRST YEAR

FIRST SEMESTER	CREDIT HOURS
ENG 3 Critical Written Expression	3
MUS 1 Listening to Music	3
MTH 24 Math Inquiry	4
HTY 13 United States History	3
1 PE Physical Education	1
Total Hours	14
SECOND SEMESTER	
ENG 7 Oral Communications	3
DRA 11 Introduction to Theatre	3
BIO 10 Introduction to Biological Science	4
HTY 14 United States History	3
2 PE Physical Education	1
Elective	3
Total Hours	17

SECOND YEAR

THIRD SEMESTER

ENG 11	Contemporary Literature	3
BIO 12	Ecology	4
SOC 8	Introduction to Sociology	3
	Electives	6
	Total Hours	16

FOURTH SEMESTER

SOC 11	Sociology of Courtship, Marriage and the Family	3
	Electives	12
	Total Hours	15

*This Specimen Program is one of many which will meet the requirements for the degree. Students should consult with their advisor concerning program requirements.

DRAMA AND THEATRE

Assistant Professor Batty

DRA 11 Introduction to Theatre—Designed to give the student a general knowledge of all aspects of a theatrical production; play selection, interpretation and the technical aspects which will culminate in actual production in which participation will be required. Field trips and attendance at other plays will also be required. Cr 3.

DRA 12 Play Production—An introduction to the theatre as a contemporary performing art, providing the student with practical hands-on experience in the technical, artistic and interpretive preparation of a dramatic presentation. All aspects of production studied as they relate to theatre in general and applied in the preparation of a specific production. Course culminates in a public performance prepared and presented by the class on the BCC campus. Prerequisite: Drama 11 or approval of instructor. Cr 3.

DRA 99 Directed Study in Theatre—Student and instructor will determine the specific nature and extent of involvement in a theatre project. Progress will be monitored through consultations with the instructor and a final report due by the last day of classes during the semester. May be repeated for a maximum of 3 credits. Prerequisite: Drama 11 or approval of instructor. This is a P/F course. Cr 1-3.

ENGLISH

Professor Nadelhaft; Associate Professors Cyrus, Danielson, Phillips; Assistant Professors Baker, Batty, Booth

General Studies "Service" Courses

2 ENG Critical Appreciation of Literature—Readings in fiction, drama and poetry; selections vary from division to division. Some divisions approach the works thematically, others chronologically, etc. This is a rather general approach to literature. Emphasis is on the student's interaction with the works, not on any particular critical method. Prerequisite: 3 ENG or permission of the division. Cr 3.

3 ENG Critical Written Expression—Intensive exercise in various types of expository writing, with constant emphasis on thought, clarity, logic, organization and development. Grammar, usage, punctuation, vocabulary and spelling are studied in relation to thought and expression. Cr 3.

4 ENG Speech—This is a basic course in oral communications designed to improve the student's oral communication by familiarizing him/her with the principles and practices of both public speaking and small group discussion. Cr 3.

5 ENG Technical Writing—Consideration of and exercise in various types of technical writing. Activities and assignments require the gathering, preparation, organization and presentation of data of a specialized nature; emphasis is on clarity, conciseness and accuracy. Cr 3.

99 ENG Topics—A flexible elective in any aspect of literature or language approved by the humanities staff. Prerequisite: 3 ENG or ENG 3 and approval of the Humanities staff. Cr 3.

Liberal Studies Courses

ENG 2 Critical Appreciation of Literature—Intended to stimulate a student's interest in reading literature, this course introduces the student to a variety of novels, short stories, plays and poems from different periods. The student is made aware of different literary themes, techniques and styles, and is given instruction in methods of literary analysis. Fall and Spring. Prerequisite: ENG 3. Cr 3.

ENG 3 Critical Written Expression—This course assumes the ability to handle a higher level of abstraction and will include more sophisticated language skills than 3 ENG. Prerequisite: Requires approval of the division subsequent to the taking of a diagnostic writing test. Cr 3.

ENG 7 Oral Communications—This is a basic course in oral communication designed to increase the students' understanding of communication and its components and to improve their skills in public speaking and group discussion. Cr 3.

ENG 10 Creative Writing—Experience in the writing of fiction, drama, poetry and songs. Students can specialize in one form or can attempt a variety of forms. Prerequisite: ENG 3 and/or permission of the division. Cr 3.

ENG 11 Contemporary Literature—Readings in major works of fiction, drama, and nonfiction which exemplify the development of literature in the contemporary period. Selections will vary from section to section, and some sections will be organized thematically, but all sections will emphasize important and recognized contemporary works. Prerequisite: ENG 2 or permission of the division. Cr 3.

ENG 14 Survey of English Literature—Within a broad historical context, the course will examine selected themes of English literature drawn from poetry, drama and fiction. Prerequisite: ENG 2 or permission of the division. Cr 3.

ENG 15 Survey of American Literature—Thematic analysis of American literature which examines the differences between neo-classic, romantic, regional, realistic, naturalist and contemporary views of experience. Sample themes might include man's relationship with the land, the artist in American society or the American hero-heroine. Prerequisite: ENG 3 or permission of the instructor. Cr 3.

ENG 16 Introduction to Films—Provides students with a critical framework for interpreting films and will show how film makers have treated various themes. Prerequisite: ENG 3. Spring only. Cr 3.

FIELD EXPERIENCE

LS 15 Cooperative Education/Field Experience—Pre-planned work experience for the Liberal Studies student, combining suitable paid work and/or volunteer work in the community with academic courses and supervision. Opportunity for the student to gain work experience, to integrate academic understanding with working life and to explore possible career goals while in college. Prerequisite: 30 hours credit with recommendations from two faculty members. Credit arranged 1 to 6 Hrs. May be taken more than once until a total of 9 credit hours is accumulated.

HISTORY

Associate Professor DeFroscia

Liberal Studies Courses

HTY 6 American Foreign Policy—An introductory survey of the foreign relations of the United States from World War II to the present. The methods and assumptions of the policy makers, the myths and fallacies of policy, and the responsibilities of states in the international family. Survey of American policy since 1945. How U.S. policy got the nation into its present international posture. An overview of the American stance in Europe, Latin America, Africa, and Asia. The United States view on such diplomatic questions as revolution, co-existence, war, and counterinsurgency. Cr 3.

HTY 7 Contemporary America—Postwar American society through the early 1970's. The political, social and cultural history of the period examined; special attention given to the challenges of the 1960's and 70's. Popular American cultures studies. No prerequisites. HTY 13 and/or HTY 14 desirable. Cr 3.

HTY 11 Western Civilization to 1714—The histories of ancient Egypt, the Near East, classical Greece and Rome, and the Middle Ages to 1714 are given preference. Emphasis is

placed on the contributions of these civilizations to the development of contemporary thought and institutions. Cr 3.

HTY 12 Western Civilization from 1714—A survey of Western civilization from the 18th century to the present. Stress on the leading political, contemporary events. Cr 3.

HTY 13 United States History to 1865—An analysis of the colonial and revolutionary years, followed by an examination of basic 19th century problems such as the acquisition of new territories, sectionalism and the Civil War. Cr 3.

HTY 14 United States History from 1865—The institutions and forces at work in the United States since the Civil War, with emphasis on the historical background of contemporary political, social and economic problems. Cr 3.

HUMANITIES

HUM 17 Literature and the Exploration of Human Values—Through reading and discussion the class will examine forces and goals which motivate and guide human behavior. Readings include representative selections from non-fiction, fiction, poetry and drama; discussions focus on what the works reveal about such forces and goals as power, wealth, ownership, status, sexuality, love, idealism and spiritual enlightenment. No prerequisites. Cr 3.

HUM 99 Topics—A flexible elective in any aspect of literature or language approved by the Humanities staff. Prerequisite: 3 ENG or ENG 3 and approval of the Humanities staff. Cr 1-3.

INTEGRATED STUDIES

INT 1 (Biology and English) Essays on Human Ecology—Introduces the student to basic ecological principles and examines certain changes in man's environment and their implications for the future of the planet and the race; the English aspect consists of readings of literature related to nature and man's relationship to nature, and occasional student essays related to various aspects of subjects covered. Prerequisite: 3 ENG or ENG 3. Cr 6. (3 in Science and 3 in English)

MATHEMATICS

Associate Professor Hsu; Assistant Professor Reilly

College of Engineering and Science

College of Life Sciences and Agriculture

General Studies "Service" Courses

1 MST Elementary Algebra and Trigonometry—Elementary algebra and trigonometry, including numbers, functions, graphs, factoring, exponents and radicals, logarithms, linear equations, quadratic equations, and solutions to triangles. Cr 3.

2 MST Mathematics I—Covers material in algebra and trigonometry. Functions, factoring and fractions, quadratic equations, exponents, radicals, complex numbers, logarithms, the trigonometric functions, radian measure, vectors, solution of triangles and trigonometric graphs. Strong emphasis on application of these principles to problems in science and engineering. Prerequisite: one year high school algebra or 3 DSM. Cr 3.

4 MST Mathematics II, Analytic Geometry and Introductory Calculus—First part covers material that forms a necessary background for calculus, such as determinants, solution if inequalities, ratio and proportion, progressions, trigonometric identities, inverse trigonometric functions, solution of trigonometric equations, and analytical geometry. Last part deals with introductory calculus, with materials involving limits, derivatives, and applications of the derivation. Prerequisite: 2 MST or its equivalent. Cr 3.

6 MST Mathematics III-Introductory Calculus—Primarily concerned with differential and integral calculus, basic concepts of differentiation and integration, further techniques and applications of the derivatives and integration. The solutions of science and engineering problems are stressed. Prerequisite: 4 MST. Cr 3.

8 MST An Introduction to Ordinary Differential Equations—Primarily concerned with the solutions of ordinary differential equations and its applications. Place transform and inverse transform are briefly dealt with. A short introduction to partial differential equations will also be taken up. Designed for the bachelor of science in Engineering Technology students. Prerequisite: 6 MST or its equivalent. Cr 3.

Liberal Studies Courses

MTH 10 Problem Solving Using Intermediate Algebra and Geometry—Emphasizes how mathematical language, concepts, and skills can be used in solving problems encountered in various interdisciplinary fields. The mathematics used would include topics of intermediate algebra and 1,2, or 3-dimensional geometry. Only a knowledge of elementary algebra is assumed. Prerequisites: 3 DSM or a year of high school algebra. Cr 4.

MTH 15 Elementary Statistics—Introductory theory of statistics is discussed. Emphasis on the basic concepts, and their applications. Collection, analysis, and presentation of data are extensively taken up. Elementary probability is covered. Decision-making with large and small samples, and prediction based on correlation and regression are also included. Prerequisite: one year of high school algebra or its equivalent. Cr 3.

MTH 24 Mathematical Inquiry—Designed for the Liberal Studies students. It is aimed at developing an appreciation of basic mathematical concepts. Elementary set theory, mathematical proofs, functions and graphs of one and two variables in first and second degree, solution of linear equations and quadratic equations, probability and statistics, interest and annuities, computers and computer programs. Prerequisite: one year of high school algebra. Lec 3, Rec 1, Cr 4.

MTH 25 An Introduction to Computer Science—Use of the computer terminal, a survey of the history and development of the computer field, operation and components of a computer, and flowcharting. The programming language BASIC is studied and applied to computer games, matrix algebra, business applications, and statistics. A brief introduction to using the Calcomp Plotter included. Cr 3.

MTH 40 Algebra & Trigonometry—A course that considers topics in algebra and trigonometry that are necessary for a student to learn before he can study calculus. Number systems, factoring, analytic geometry, functions, equations, trigonometric functions, and their application. Prerequisite: one year of high school algebra or 3 DSM. Lec 3, Rec 1, Cr 4.

MTH 41 Calculus I—An introduction to differential and integral calculus. Limits, continuity, differentiation and integration of algebraic functions, applications. Prerequisite: MTH 40 or its equivalent. Lec 3, Rec 1, Cr 4.

MTH 99 Topics in Mathematics—An independent study undertaken by a student by special arrangement with the Division of Natural Sciences and Mathematics, or a special course created at the request of a group of students with specific interests that are not served by a regularly scheduled course. Cr 1-3.

MUSIC

Associate Professor Klocko

Liberal Studies Courses

MUS 1 Listening to Music—Development of intelligent music listening through the study of musical elements, instruments, mediums, and principles of musical forms in classical, popular and non-Western music. Listening to records and tapes; live and TV concerts integrated with class discussion. Cr 3.

MUS 2 Listening to Orchestral Music—Students learn to listen to orchestral music actively and intelligently. Study of musical elements, instruments, and orchestral forms and styles; historical development of the orchestra and orchestral literature; and selected works or representative composers. Course content is correlated with concerts of the Bangor Symphony Orchestra, the UMO Orchestra, and touring orchestras. Cr 3.

MUS 10 American Music—Music in America from colonial times to the present. Emphasis on the development of the musics unique to America, including American Indian, country and western, spirituals, gospel, blues, ragtime, and the different styles of jazz. Cr 3.

MUS 11 PopRockSoul—Popular music today, covering the types of popular music and their interactions, important performers and composers, the music industry and the mass media, and the sociological role of popular music as an expression of differing and changing values in American culture. Cr 3.

MUS 70 The All-Time American Music Catalog—Rehearsal and performance of various types of American choral music. Open to all BCC-UMO students, faculty, and staff, and members of the community who enjoy singing. Basic ability to read music required. Atten-

dance at all rehearsals and public performances required. May be repeated for credit. Lab 2, Cr 1.

MUS 99 Directed Study in Music—Individually designed study in an area of music-making, such as piano, recorder, voice, sight-singing, or music theory. One private lesson per week. Course may be repeated if enrollments permit. Prerequisite: permission of the instructor. Cr 3.

NATURAL SCIENCES

Associate Professors Benson, Storch, Zoldi; Assistant Professor Naber

Liberal Studies Courses

BIO 5 Human Biology—An introductory level course in biology for non-science majors. Essential concepts and principles of life are emphasized; the human species is the central theme. Lec 3, Cr 3; Lab 3, Cr 1; Total Cr 4.

BIO 10 Introduction to Biological Science—A basic biology survey course dealing with principles of life as illustrated by animals, plants and micro-organisms. Includes properties of cells, structure and function of plant and animal systems, heredity and evolution. Lec 3, Lab 3, Cr 4.

BIO 12 Ecology—Principles and processes of natural ecosystems from the biological perspective. The relationships of organisms to each other and their environment. Selected aspects of human ecology will be considered but are not the major emphasis. Investigative laboratory and field work. Lec 3, Lab 3, Cr 4.

BIO 15 Intregrated Health Science—Provides introductory information in general biology, microbiology, anatomy and physiology, and biochemistry in an integrated manner. Course is team taught by appropriate instructors in the Math-Science Division. Lec 3, Lab 6, Cr 5.

BIO 50 Anatomy and Physiology—The structural and functional relationships of the human body systems. Concepts of the regulatory process that integrate body cells, tissues, and organs. Lec 3, Lab 3, Cr 4.

BIO 55 Medical Microbiology—Cell structure, metabolism, and the role of microorganisms in disease. Microbial control, infection, immunity, host-parasite relations, and epidemiology. Laboratory study includes the properties of bacteria and related organisms, techniques and means of identification. Lec 3, Lab 3, Cr 4.

BIO 65 Nutrition—The fundamental principles of normal nutrition, the functions of various nutrients and their sources, deficiencies and food values. Prerequisite: BIO 70 or permission. Lec 3, Cr 3.

BIO 70 Introduction to Biochemistry—Basic principles of general, organic, and biochemistry are covered. Organic structures and functional groups are introduced. Topics in biochemistry include carbohydrates, lipids, proteins, nucleic acids, and enzyme action. High school chemistry is recommended. Lec 3, Lab 3, Cr 4.

BIO 99 Topics in Biology—An independent study undertaken by a student by special arrangement with the Division of Natural Sciences and Mathematics, or a special course created at the request of a group of students with specific interests that are not served by a regularly scheduled course. Cr 1-3.

PHYSICAL EDUCATION

Lecturer Wallace

1, 2, PE Physical Education—These courses or their equivalent are required for all non-veteran students in the General/Liberal Studies program for one credit per semester. All divisions are co-ed and are open to all BCC students. Courses include instruction and participation in individual and team sports, indoor and outdoor. Cr 1. Pass/Fail.

POLITICAL SCIENCE

Associate Professor Surpless

General Studies "Service" Course

4 POL National Government—Fundamentals of American democracy. The Constitution and the structure of the government (i.e., the presidency, bureaucracy, Congress, and national

courts) is examined along with federalism, political parties, interest groups and political expression. Cr 3.

5 POL State and Local Government—An introductory study on the structure and operation of state and local governments. An examination of state constitutions, the state-federal relationship, the governor's office, state legislators and state judiciary. The process of local self-government including mayor-council, council manager, and commission forms of government as well as forms, procedures, and problems in metropolitan areas. Cr 3.

Liberal Studies Courses

POL 4 National Government—An introductory study of the major principles, structures, and processes of the U.S. National government. A study of the Constitution and its development, federalism, separation of powers, the development and role of political parties, interest groups, voting behavior, the presidency, the bureaucracy, Congress, the national courts, and political expression. Cr 3.

POL 5 State and Local Government—An introductory study on the structure and operation of state and local governments. An examination of state constitution, the state-federal relationship, the governors' office, state legislators and state judiciary. The process of local self-government including mayor-council, council manager, and commission forms of government as well as forms, procedures, and problems in metropolitan areas. Cr 3.

POL 6 The Election Process—Surveys the election process in the United States. Nomination procedures, political parties, campaigns, and election results. The role of the new technology in campaigns and the impact and responsibility of the press will be analyzed. Provides an opportunity for the student to gain an insight into the election process by practical experience in an actual campaign. Part of the class time will be devoted to the practical lab experience. Cr 3.

PSYCHOLOGY

Assistant Professor Paré

General Studies "Service" Courses

7 PSY Introduction to Psychology—Introduction to the scientific study and interpretation of behavior. Psychological development, emotion, motivation, perception, learning, thinking and cognitive processes, intelligence, personality and animal behavior. Basic principles and their practical application. Cr 3.

8 PSY Psychology of Adjustment—Processes involved in the adjustment of the individual to the problems of everyday living. Study of techniques of adjustment to meet conflict situations in the social environment and to those aspects of adjustment directly related to personal growth. Cr 3.

10 PSY The Psychology of Human Sexuality—An exploration of human sexuality in light of current knowledge and contemporary problems. The physiology of human sexual behavior, cultural variations in sexual behavior patterns, and problems involving sexuality in our culture (e.g. sexuality and problems of identity, commercialized sex, sex and marriage, female sexuality and the liberated woman). Cr 3.

23 PSY Abnormal Psychology—An introduction to and understanding of behavior disorders and insight into the personality of the disturbed person. Historical perspective of changing classification and therapy. The prevention, analysis and rehabilitation of disturbed individuals, the resources of assistance for the individual with emotional difficulties. Prerequisite: an introductory psychology course or permission of the instructor. Cr 3.

Liberal Studies Course

PSY 7 Introduction to Psychology—Introduction to the scientific study and interpretation of behavior. Psychological development, emotion, motivation, perception, learning, thinking and cognitive processes, intelligence, personality and animal behavior. Basic principles and their practical application. Cr 3.

PSY 8 Psychology of Adjustment—The study of processes involved in the adjustment of the individual to the problems of everyday living. Emphasis on techniques of adjustment to meet conflict situations in the social environment and to those aspects of adjustment directly related to personal growth. Cr 3.

PSY 9 Child and Developmental Psychology—An introduction to developmental theories and principles in psychology. Emphasis on human socio-emotional and cognitive development from birth to maturity. Cr 3.

PSY 11 Adolescent Psychology—Biological, social, affective, and cognitive aspects of the development of adolescents from puberty to young adulthood. The research, theories, concepts, and principles pertaining to adolescent psychology are presented. Prerequisites: PSY 7 and PSY 8, or permission of instructor. Cr 3.

PSY 13 The Growing Years—The development of the child from earliest womb environment through adolescence. Interplay of biological factors, human interaction, social structure and cultural forces in shaping the growing child. Major psychological theories introduced, followed through various stages of development. Course developed in a series of 30 television programs supported by coordinating textual material and by additional print materials. Film programs will be broadcast by MPBN in half-hour segments twice weekly for 15 weeks. No prerequisite. Cr 3.

SCIENCE

Associate Professors Benson, Storch, Zoldi; Assistant Professor Naber

SCI 12 Energy, Food, and Shelter—Investigation of ecologically appropriate shelter design, construction alternatives, materials, and alternative energy sources. The basic concepts of energy, solar greenhouses, organic agriculture and aquaculture, and passive solar design fundamentals. Students participate in design projects, and field trips. Lec 3, Cr 3.

SCI 40 Our Physical World—Physical characteristics of the earth, the solar system and the universe. Rock forming processes, processes shaping the earth, and man's action and reaction to procedures to alter the processes. Continuous processes in the universe and their effect on man's future. Class discussion with minimum lectures. Study of an area of each student's choice by the use of lab exercises, field trips, and a mandatory research paper describing the geological processes of the area selected. Lec 3, Lab 3, Cr 4.

SCI 45 Principles of Physics—Fundamentals of mechanics, energy, properties of matter, heat, and wave characteristics. Emphasis on developing ability to understand concepts, laws, and theories, and their applications to the real world. Laboratory work includes observation and recording of data, graphing, techniques in set-up, use and adjustment of equipment. Lec 3, Lab 3, Cr 4.

SCI 50 Principles of Chemistry—A survey of major topics in general chemistry. Descriptive and qualitative approaches are used to develop an understanding of chemical principles. Quantitative relationships that strengthen the principles covered emphasized. Provides a strong foundation for subsequent work in chemistry courses. Lec 3, Lab 1, Cr 4.

SCI 99 Topics in Physical Science—An independent study undertaken by a student by special arrangement with the Division of Natural Sciences and Mathematics, or a special course created at the request of a group of students with specific interests that are not served by a regularly scheduled course. Cr 1-3.

SOCIOLOGY

Professor Hyatt; Associate Professor Gran

General Studies "Service" Courses

8 SOC Introduction to Sociology—The basic concepts and descriptive materials of sociology: society, culture, social organization, social interaction, human ecology and social and cultural change. Cr 3.

10 SOC Contemporary Social Problems—An analysis of contemporary social problems of the United States. Problems of social deviance, conflict and inequality, and human progress. Prerequisite: 8 SOC or SOC 8. Cr 3.

Liberal Studies Courses

SOC 8 Introduction to Sociology—An introductory semester course which presents the fundamentals of sociology; description and analysis of the structure and dynamics of human society; social norms, intergroup relations, social change, stratification and institutions. Cr 3.

SOC 9 Juvenile Delinquency—Problems of the individual in his social environment and group forces which lead to maladjustment will be analyzed. Analyzes the delinquent youth from the viewpoint of the parent, teacher, and youth organization leader. Prerequisite: 8 SOC or permission of the instructor. Cr 3.

SOC 10 Contemporary Social Problems—An analysis of contemporary social problems of the United States. Emphasis on problems of social deviance, conflict and inequality, and human progress. Prerequisite: 8 SOC or SOC 8. Cr 3.

SOC 11 Courtship, Marriage, and the Family—A sociological analysis of the historical and contemporary American courtship, marriage, and family patterns and related controversies. The course will also examine crosscultural courtship, marriage and family patterns. Prerequisite: SOC 8 or 8 SOC or permission of the instructor. Cr 3.

SOC 12 Man and His Culture—An introduction to the fundamental concepts and perspectives of culture. This course surveys the dynamics of cultural evolution and its significance to man. Special attention will be directed toward cultural theory, language and culture, the social, economic, political and ideological aspects of the organization of culture, culture and personality and the dynamics of culture change. Cr 3.

SOC 13 Sociology of Death—An analysis of the topics of death and dying from a sociological point of view. The course will examine death and dying as a biological reality, as a social and cultural phenomenon, as a spiritual and religious occurrence, and as an economic reality. Cr 3. Prerequisite: SOC 8.

Liberal Studies Course

SCS 99 Topics in Social Science—Exploration in any area of the social sciences approved by the social science faculty. Topics may vary from semester to semester depending upon expressed interest and identified needs. A topic may be analyzed from the perspective of one or all of the disciplines in social science, such as: women in politics, the urban environment, the American city, perspectives on death and dying. Prerequisite: permission of the social science staff. Cr 3.

HONORS PROGRAM (HR)

The Honors Program Faculty at Bangor Community College consists of Associate Professor DeFroscia and Professor Nadelhaft; Four Program Faculty Representatives; Professor Schuman (Director of UMO/BCC Honors Program), and Associate Professor Surpless (College Honors Secretary)

Two-year students of exceptional academic ability are invited to apply to pursue an associate degree with honors. Students enrolled at BCC are normally granted admittance to the Honors Program after the first semester of work on the basis of their grade point average and faculty recommendation. However, students of exceptional ability can be admitted directly from high school as first semester freshmen on the basis of their admission folder and an interview with the Honors Director and the College Honors Secretary. In order to earn an associate degree with honors a *minimum* of 9 hours of Honors courses is required. This would include a minimum of two Honors courses from the freshman/sophomore sequence plus the sophomore Honors independent study project.

The freshmen/sophomore courses—HR 41, 45, 47, and 48 are taken in common with students from the other five colleges within the University and are taught by faculty drawn from all colleges of the University. The independent study project (HR 50) is undertaken in the fourth semester and is done in the student's career area or, in the case of the Liberal Studies student, in an area of special interest.

Additional information about the Honors Program and a full description of courses will be found in this catalog. (see index.)

HR 41, HR 45, HR 47, 48, and HR 50 meet the free elective requirement. HR 50 upon the discretion of the program faculty may also meet area distribution requirements.

HR 41. Honors Freshman Seminar

HR 45. Honors Colloquium

HR 46. Honors Summer Readings

HR 47.48. Honors Group Tutorial

HR 50. Honors Independent Study Project

SCIENCE CLINIC

Associate Professor Zoldi

Each summer, students are afforded the opportunity to improve their skills and knowledge in freshman level physical science and engineering courses.

1 DSA Individual Mathematics Preparation—Designed primarily for those who need assistance in gaining specific math skills normally required of students interested in pursuing the following career areas: physical sciences, biological sciences, allied health, agriculture, business, clerical trades, and general trades (construction, electrical and electronics, drafting, etc.). Weakness in math competences required in specific career goals will be determined, and these deficiencies will be incorporated into an individualized program of study. M,T,W,Th 5:00-6:40 p.m. EP Lobby. Cr 3.

2 DSA Fundamentals of General Chemistry—Designed primarily for those who need assistance in gaining specific chemistry competencies normally required of students interested in pursuing the following careers: physical sciences, biological sciences, allied health, engineering and agriculture. Weakness in chemistry competencies required in specific career goals will be determined, and these deficiencies will be incorporated into an individualized program of study. M,T,W,Th 7:00-8:40 p.m. BH 105. Cr 3.

99 DSS Developmental Studies Skills: Fundamentals of General Physics—Designed primarily for those who need assistance in gaining specific physics competencies normally required of students interested in pursuing the following careers: physical sciences, biological sciences, allied health, engineering and agriculture. Weakness in physics competencies required in specific career goals into an individualized program of study. M,T,W,Th 7:00-8:40 p.m. EP Lobby. Cr 3.

For additional information and admission information to the Summer Science Clinic contact:

Professor John Zoldi
Science Clinic 1980
Bangor Community College
Bangor, Maine 04401
Tel: 947-4930

HEALTH AND HUMAN SERVICES DIVISION

Associate Professor White (Chairperson)

The Health and Human Services Division offers associate of science degree programs in Dental Hygiene, Chemical Addiction Counseling, Child Mental Health, Developmental Disabilities, Gerontology, and Mental Health. Additionally a certificate program in Dental Assisting is offered. Through an annual contract with the Maine Bureau of Rehabilitation, the Department offers a nine-month training program for physically handicapped persons in computer programming.

DENTAL HYGIENE

Associate of Science Degree Program

Associate Professor Burns (Director), Assistant Professor Lee; Instructors Bearor, Bell, Eddy, Graham, Jordan, Machtel

A program in dental hygiene provides an attractice opportunity to men and women interested in health careers. The main concern of the dental hygienist is the maintenance of good oral health. The student is educated to perform many functions including oral inspection, scaling and polishing of teeth, fluoride treatments, exposing and processing x-rays, and the education of patients in good oral health habits. Laboratory equipment and a dental hygiene clinic are part of the facilities provided in the program.

Extramural clinical experience is gained through the cooperation of the Veterans Administration Center in Togus, Maine. In addition to the permanent faculty, staff is also drawn from practicing dentists and dental hygienists in the area. Courses are designed to give the student a well-rounded foundation in health sciences, specific knowledge and clinical skills in the dental sciences and an understanding in the humanities. Courses are particularly suited to those who have a sincere interest in science and enjoy working with people.

Admission—Recommended for admission to the program is a college preparatory course in high school, including laboratory courses in biology and chemistry. The applicant must also write the Scholastic Aptitude Tests of the College Entrance Examination Board and the Allied Health Admissions Test. It is solely the responsibility of the applicant to insure that the completed application (i.e., high school transcript, any transcripts of grades beyond high school, test scores, recommendations, etc.) are received by the Admissions Office. The deadline for making application is December 15.

Fee—Each dental hygiene student purchases an instrument kit, a lab coat and two clinical uniforms with name tapes and pins. Transporation costs to attend extramural clinical sites within Bangor area are the students' responsibility as are the licensing examination fees. Laboratory fees include:

$4.00 (DHY 24)
3.00 (DHY 23)
4.00 (DHY 33)

The estimated cost including books, beyond room, board and tuition, is approximately $900 total for the two years. These fees are subject to change without notice.

Academic Progress—Students in the Dental Hygiene Program must earn a grade of C or better in all Dental Hygiene courses and an overall average of 2.0 to graduate. All courses in a semester must be passed before the student is admitted to the next semester, with a grade of C or better being the passing grade for all Dental Hygiene courses. Professional behavior and attitude are expected at all times.

Degree—Upon successful completion of this program, the student will be awarded the Associate of Science in Dental Hygiene.

Transfer—There is a transfer agreement with the School of Human Development College of Life Science and Agriculture, which enables Dental Hygiene students to complete a baccalaureate degree in two additional years.

SPECIMEN PROGRAM

FIRST SEMESTER		Credit Hours
ENG 3	Critical Written Expression	3
BIO 50	Human Anatomy and Physiology	4
BIO 70	Introduction to Biochemistry	4
DHY 10	Preclinical Dental Hygiene	3
DHY 11	Preclinical Dental Hygiene Theory	2
DHY 12	Dental Anatomy	3
	Total Hours	19
SECOND SEMESTER		
BIO 55	Medical Microbiology	4
DHY 25	Nutrition	3
DHY 20	Clinical Dental Hygiene I	2
DHY 21	Clinical Dental Hygiene Theory I	2
DHY 22	General and Oral Pathology	2
DHY 23	Head and Neck Anatomy	2
DHY 24	Dental Radiology	3
	Total Hours	18
THIRD SEMSTER		
ENG 7	Oral Communications	3
DHY 30	Clinical Dental Hygiene II	3
DHY 31	Clinical Dental Hygiene Theory II	2
DHY 32	Pharmacology and Anesthesiology	2
DHY 33	Dental Materials	3
DHY 34	Periodontology	2
DHY 35	Community Dentistry	3
DHY 36	Ethics, Jurisprudence and Office Management	2
	Total Hours	20
FOURTH SEMESTER		
PSY 7	Introduction to Psychology	3
SOC 8	Introduction to Sociology	3
DHY 40	Clinical Dental Hygiene III	3

DHY 41	Clinical Dental Hygiene Theory III	2
DHY 42	Dental Specialties	3
	Total Hours	14

Dental Hygiene Courses

DHY 10 Preclinical Dental Hygiene—Practical experience in techniques of instrumentation, operation and maintenance of chairside and support equipment and data gathering procedures. Prerequisite: enrollment in Dental Hygiene Program. Lab 6, Cr 3. Pass/Fail.

DHY 11 Preclinical Dental Hygiene Theory—Essentials of dental hygiene theory and practice as it relates to clinical experience. Prerequisite: enrollment in Dental Hygiene Program. Lec 2, Cr 2.

DHY 12 Dental Anatomy—Tooth morphology and function, tissue of the oral cavity, gross anatomy of the head and neck and its relationship to the functioning of the oral cavity. Prerequisite: enrollment in Dental Hygiene Program. Lec 2, Lab 2, Cr 3.

DHY 20 Clinical Dental Hygiene I—Practical application of dental hygiene theories and techniques with emphasis on individual patient's oral health needs, patient education, time and motion analysis and emergency procedures. Prerequisite: DHY 10, 11, 12, BIO 50, 70. Clinic 8 hours, Cr 2. Pass/Fail.

DHY 21 Clinical Dental Hygiene Theory I—Introduction to the theories and techniques of clinical dental hygiene practice with particular emphasis on patient instruction, clinical equipment and instrumentation. Prerequisite: DHY 10, 11, 12, BIO 50, 70. Lec 2, Cr 2.

DHY 22 General and Oral Pathology—General pathology, with emphasis on the tissues of the oral cavity and surrounding structures and clinical differentiation between the normal and abnormal appearance of tissues. Prerequisite: DHY 10, 11, 12, BIO 50, 70. Lec 2, Cr 2.

DHY 23 Head and Neck Anatomy—The origin and structure, growth and development and microscopic anatomy of tissues with emphasis on tissues of the oral cavity and surrounding structures. Prerequisite: DHY 10, 11, 12, BIO 50, 70. Lec 1, Lab 2, Cr 2.

DHY 24 Dental Roentgenology—Ionizing radiation, the history of x-rays, their production and properties, radiation measurement, radiation hazards and principles of radiation safety. The theory and practice of exposing, processing, mounting and interpreting dental radiographs. Prerequisite: DHY 10, 11, 12, BIO 50, 70. Lec 1½, Lab 3, Cr 3.

DHY 25 Nutrition—Fundamental principles of normal nutrition, the functions of various nutrients, nutritional deficiencies, food values, eating patterns, food purchasing and preparation. Emphasis on relationship of nutrition and oral health and to the nutritional counseling of the dental patient. Prerequisite: BIO 70; DHY 20, taken concurrently. Lec 2, Lab 1, Cr 3.

DHY 30 Clinical Dental Hygiene II—A continuation of the practical application of dental hygiene theories and techniques with emphasis on selected advanced techniques. Students will rotate through the extended clinical facility at the V.A. Center Hospital in Togus. Prerequisite: DHY 20, 21, 22, 23, 24, DHY 25, BIO 55. Clinic 12 hours, Cr 3. Pass/Fail.

DHY 31 Clinical Dental Hygiene Theory II—Concentrates on refining theories and techniques of clinical dental hygiene practice with emphasis on myofunctional therapy, emergency procedures, appointment planning, problem oriented patient treatment planning, clinical photographs and study models. Prerequisite: DHY 20, 21, 22, 23, 24, 25, BIO 55. Cr 2.

DHY 32 Pharmacology and Anesthesiology—The use of drugs and anesthetics with emphasis on those used in dental practice. Prerequisite: DHY 20, 21, 22, 23, 24, 25, BIO 55. Lec 2, Cr 2.

DHY 33 Dental Materials—Various dental procedures, materials and devices commonly used in dental practice. Prerequisite: DHY 20, 21, 22, 23, 24. Lec 2, Lab 2, Cr 3.

DHY 34 Periodontology—Clinical features, histopathology and diagnosis of various forms of periodontal disease and the philosophy of various surgical and nonsurgical periodontal treatments. Prerequisite: DHY 20, 21, 22, 23, 24, 25, BIO 55. Lec 2, Cr 2.

DHY 35 Community Dentistry—Current concepts in community oral health education, audiovisual techniques, group motivation, public health agencies, programs and project planning and the essentials of epidemiology. Prerequisite: DHY 20, 21, 22, 25. Lec 2, Lab 2, Cr 3.

DHY 36 Ethics, Jurisprudence and Office Management—Professional ethics, dental jurisprudence and management in the dental office. The course is meant to give the student

background in efficient managment of time and space and guidelines for the professionals in relation to laws governing the practice of dental hygiene. Prerequisite: DHY 20, 21, 24. Lec 2, Cr 2.

DHY 40 Clinical Dental Hygiene III—Practical application of dental hygiene theories and techniques with special emphasis on individual's oral health needs, patient education, time and motion efficiency and expanded duties according to the Maine State Dental Practice Acts. Students will rotate through the extended clinical facility at the V.A. Center Hospital at Togus. Prerequisite: DHY 30, 31, 32, 33, 34. Clinic 16 hours, Cr 3. Pass/Fail.

DHY 41 Clinical Dental Hygiene Theory III—A consolidation of dental hygiene theories and techniques with emphasis on comprehensive procedure planning and advanced dental hygiene techniques. Prerequisite: DHY 30, 31, 32, 33, 34. Lec 2, Cr 2.

DHY 42 Dental Specialties—The student will gain knowledge of an appreciation for specialty practices, their theories and functions as demonstrated by class participation. Prerequisite: DHY 20, 21, 22, 23, 24, 25, BIO 55. Lec 2, Lab 2, Cr 3.

DHY 69 Environmental Control of the Dental Operative Field—This will develop the paticipants knowledge of a special task that enhances the quality and quantity of restorative dental services available for the patient. Cr 1.

DHY 99 Special Topics in Dental Auxiliary Education—Specialized theory and skills in auxiliary disciplines. Topics vary from semester to semester, depending upon expressed interests or identified needs. Designed to fill specialized needs of a given student population or address immediate dental auxiliary issues and trends outside of current course offerings. Prerequisite: permission of instructor. Cr 1-4.

DENTAL ASSISTING CERTIFICATE PROGRAM

Assistant Professor Lee; Instructor Graham

This program is designed for individuals who are interested in becoming members of the dental health care delivery system. The curriculum is designed to provide a broad educational experience in the theory and practice of dental assisting as well as a background in biological science and humanities.

The dental assisting student will be educated in all aspects of four-handed dentistry and in all duties which may be delegated to dental assistants as expressed in the Maine Dental Practice Act. Students gain practical experience through clinical and laboratory sessions and through assignments to private practices, dental offices, community and hospital dental clinics.

The courses of study are particularly suited to those who have a sincere interest in science and enjoy working with people.

The dental assisting program has been accredited by the American Dental Association.

Admission—To be eligible for admission the applicant must have graduated from an accredited high school or hold a certificate of high school equivalency with an academic average of at least a 2.0 on a 4.0 scale. The applicant is required to have one year of a laboratory science, preferably biology or chemistry, and have satisfactorily completed courses in mathematics and typing. The applicant is also required to take the Allied Health Admissions Test. A physical examination, including dental and optical, will be required within three months prior to the beginning of the first term. A personal interview will be required for those meeting the admission requirements. It is solely the responsibility of the applicant to insure that the completed application (i.e., high school transcripts, test scores, any transcripts of grades beyond high school, recommendations, etc.) are received by the admissions office. The deadline for making application is May 1.

Fees—Beyond the expense for tuition, room, board and books, students will purchase a laboratory coat and a clinical uniform. Transportation costs to clinical assignments within the Bangor area are the student's responsibility as are certification examination fees. Laboratory fees include:

$4.00 (DHY 33) Fall
4.00 (DAS 11) Fall
3.00 (DHY 23) Spring
4.00 (DHY 24) Spring

Academic Progress—Students in the dental assisting program must earn a grade of "C" or better in all dental assisting courses and an overall grade point average of 2.0 to graduate with a Certificate in Dental Assisting. Professional conduct and attitude are expected at all times.

Certification—Upon graduation students will be eligible to take the Certification Examination for Dental Assistants administered by the Certifying Board of the American Dental Assistants Association.

DENTAL ASSISTING PROGRAM

FIRST SEMESTER		Credit Hours
BIO 15	Integrated Health Science	5
DAS 10	Introduction to Dental Assisting	1
DAS 11	Chairside Dental Assisting I	5
DHY 12	Oral, Head and Neck Anatomy	3
DHY 33	Dental Materials	4
	Total Hours	18
SECOND SEMESTER		
DAS 20	Clinical Practice I	2
DAS 21	Chairside Dental Assisting II	3
DHY 22	General and Oral Pathology	2
DHY 23	Oral Histology and Embryology	2
DHY 24	Dental Radiology	3
DAS 25	Dental Health Education	3
DAS 26	Dental Therapeutics and Office Emergencies	2
PSY 7	Introduction to Psychology	3
	Total Hours	20
THIRD SEMESTER		
DAS 30	Clinical Practice II	6
DAS 31	Dental Assisting Seminar	1
DAS 32	Dental Office Management	3
ENG 3	Critical Written Expression	3
	Total Hours	13

Dental Assisting Courses

DAS 10 Introduction to Dental Assisting—The history of dentistry, professional ethics and jurisprudence and the roles of each member of the dental health team. Basic terminology will be introduced. Prerequisite: Enrollment in the Dental Assisting Program. Lec 1, Cr 1.

DAS 11 Chairside Dental Assisting I—Introduces the use of dental and laboratory equipment, patient and operator positioning and the essentials of disease transmission and control. Instrument set-ups, use and transfer will be stressed. Prerequisite: enrollment in the Dental Assisting Program. Lec 3, Lab 4, Cr 5.

DAS 20 Clinical Practice I—Gives the student the opportunity to practice chairside dental assisting under direct supervision in private practice offices, community and hospital dental clinics. Prerequisite: DAS 10, 11, DHY 12, 33, BIO 15. 8 hours clinic, Cr 2.

DAS 21 Chairside Dental Assisting II—Various specialty practitioners present the fundamental concepts of periodontics, orthodontics, endodontics, pedodontics and oral surgery. Emphasis on the dental assistant's role in these areas. During laboratory sessions students will have the opportunity to assist in various specialty procedures. Prerequisite: DAS 10, 11, DHY 12, 33, BIO 15. Lec 2, Lab 2, Cr 3.

DAS 25 Dental Therapeutics and Office Emergencies—The essentials of drug action, administration and toxicity of drugs. Emphasis on analgestics, sedatives, hypnotics, stimulants and anesthetics. Chemo-therapeutic agents related to infection and infectious diseases, histamine, antihistamine and steroids are presented. First aid techniques and interceptive procedures for dental office emergencies are stressed. Prerequisite: DHY 12, BIO 15. Lec 2, Cr 2.

DAS 26 Dental Health Education—Emphasis on the theories and techniques of patient education and motivation. Areas stressed include caries and periodontal disease prevention, plaque control methods and human nutrition. Students conduct oral health and nutritional counseling sessions. Prerequisite: DHY 12, BIO 15. Lec 2, Lab 2, Cr 3.

DAS 30 Clinical Practice II—A continuation of DAS 20 Clinical Practice I whereby students will be assigned three days per week rotations in private offices, community and hospital dental clinics. Prerequisite: DAS 20, 21, 25, 26, DHY 22, 23, 24. Cr 6.

DAS 31 Dental Assisting Seminar—Provides a consolidation of dental assisting theories and techniques with emphasis on the role of a dental assistant as a member of the dental health team, the principles of work simplification and efficiency of motion. Prerequisite: DAS 20, 21, 25, 26, DHY 22, 23, 24. Lec 1½, Cr 1.

DAS 32 Dental Office Management—This course encompasses various aspects of office management including appointment control, business and patient record-keeping, patient management and effective communication. Prerequisite: DAS 20, 21, 25, 26, DHY 22, 23, 24. Lec 4½, Cr 3.

HUMAN SERVICE PROGRAMS

Associate of Science in Human Services

Associate Professor Cormier; Assistant Professors Healey, Gemmel, and Setter; Instructor Scott

The Human Service Career programs are designed to provide liberal arts education and both professional courses and supervised practicum within the area of the students' program option. Graduates will be prepared for entry and middle-level positions within the human service delivery system.

The Human Service generalist is prepared within a cross-disciplinary curriculum and graduates will have developed specific competencies to:

a. Function in prevention programming, and direct non-residential, residential, and after-care services.

b. Serve as an expediter in linking services in the community to persons in need of those services.

c. Interview clients and families to obtain factual information and to identify initially the clients' problems so that appropriate assistance can be provided.

d. Collect data and assist in the development and execution of research programs.

e. Counsel, under professional supervision, individuals and groups.

The Human Service Programs are approved by the National Council for Standards in Human Service Education.

Transfer—Although the Human Services programs are designed to prepare graduates for employment, transfers to baccalaureate programs are appropriate for those demonstrating the potential. Although transferability depends on the receiving college, graduates have transferred with full transferability to related baccalaureate programs within the University of Maine system and other academic institutions.

Academic Progress—Students in the Human Services programs are expected to maintain the same academic level or standing as defined in the student handbook. Required courses and the minimum number of credit hours as defined by the program option curriculum must be satisfactorily completed. A grade of "C" or above is required in all practicum courses. For graduation, an accumulative average of 2.0 is required for human service courses, excluding practica. An accumulative average of 2.0 is required for graduation.

The Human Services Program faculty and administration reserves the right to retain only those students who, in their judgment, possess academic, health and personal suitability for human service programs. Health and personal suitability criteria will be communicated to each student in writing at the beginning of the student's program. Student assessment is carried out by the faculty on a monthly basis.

The Human Services Program faculty and administration reserves the right to make curriculum and policy changes as necessary for continued high level professional education. Students would be apprised of such changes and informed of available options.

Admissions—Program applicants are required to submit two letters of recommendation from professionals who can comment on their potential to be effective in helping relationships, prior to a personnal interview which is required for admission.

Degree—Upon successful completion of this program, the student will be awarded the Associate of Science in Human Service.

Transportation—Transportation to and from practicum locations is the student's responsibility.

Registration—It should be noted that any HSV student wishing to register in any one semester for more than 16 semester hours (exclusive of Physical Education) must obtain permission from his/her advisor.

Identification Pins—Personalized pins are worn while on field placements beginning in the second semester of the curriculum. Orders are placed by the student at the campus bookstore prior to November 15. The cost to be paid by the student is approximately $2.50.

CHEMICAL ADDICTION COUNSELING

This career program provides the graduate with skills necessary to work, under supervision, within the specialized areas of prevention, treatment, rehabilitation and aftercare.*

Candidates for admission must be committed to a career of working with alcoholics and/or drug addicts. Those whose lives have been touched by alcoholism or drug addiction, their own or that of a family member, are particularly encouraged to apply. Former alcoholics or drug addicts must have demonstrated sobriety or abstention to be admitted to the program.

Curriculum

FIRST SEMESTER	Hours
3 ENG Critical Writ. Express.	3
7 PSY Intro. to Psych.	3
8 SOC Intro. to Soc.	3
10 HSV Group Processes	3
1 HSV Intro. to Human Services	3
Total Hours	15

SECOND SEMESTER	Hours
4 ENG Speech	3
8 PSY Psych. of Adjust.	3
BIO 5 The Human Organism	4
16 HSV Alcohol and Alcoholism	3
20 HSV Human Ser./Chem. Addiction Coun. Practicum	4
Total Hours	17

THIRD SEMESTER	
12 HSV Interviewing/Counseling	3
17 HSV Alcohol Treatment and Rehab.	3
14 HSV Behavior Res. Method.	3
19 HSV Drugs: Use & abuse	3
21 HSV Human Service/ CAC Practicum	4
Total Hours	16

FOURTH SEMESTER	
18 HSV Prev. & Early Det. of Substance Abuse	3
10 SOC Cont. Social Prob.	3
23 HSV Human Service/CAC Practicum	6
Elective	3
Total Hours	15

*The first semester is offered alternate years, 1980, 1982, etc.

CHILD MENTAL HEALTH

This program is designed to prepare graduates to work in prevention, non-residential, residential and rehabilitation programs for youth and adolescents. Associate Degree Child Mental Health practitioners will function under supervision as direct line providers of child mental health services.

Curriculum

FIRST SEMESTER	Hours
10 HSV Group Process	3
1 HSV Intro. to Human Services	3
3 ENG Critical Written Express.	3
7 PSY Intro. to Psychology	3
8 SOC Intro. to Sociology	3
Total Hours	15

SECOND SEMESTER	Hours
4 ENG Speech	3
BIO 5 The Human Organism	3
11 HSV Psycho-Social Evaluation	3
20 HSV Practicum in Human Serv.	4
PSY 9 Child Psychology	3
Total Hours	17

THIRD SEMESTER	
21 HSV Practicum in Human Services	4
30 HSV Senior Seminar or elective	3
44 HSV Behavior Modification	3
50 HSV Child Mental Health	3
PSY Adolescent Psychology	3
Total Hours	16

FOURTH SEMESTER	
12 HSV Interviewing & Counseling	3
14 HSV Behavioral Research Methods	3
23 HSV Practicum in Human Services	6
51 HSV Adolescent Mental Health	3
Total Hours	15

Applications are received for the Child Mental Health Program for Spring Semesters.

DEVELOPMENTAL DISABILITIES

The developmental disabilities option of the Human Service Programs is designed to prepare individuals to work primarily in direct services under professional supervision within an area of specialization, such as: mental retardation, cerebral palsy, epilepsy, autism or other handicapping conditions.*

Curriculum

FIRST SEMESTER	Hours
3 ENG Crit. Writ. Express.	3
7 PSY Intro. to Psych.	3
8 SOC Intro. to Soc.	3
10 HSV Group Proc.	3
1 HSV Intro. to Human Service	3
Total Hours	15

SECOND SEMESTER	Hours
4 ENG Speech	3
PSY 9 Child and Develop. Psych.	3
BIO 5 The Human Organism	4
20 HSV Human Service/Develop. Disabil. Practicum	4
41 HSV Nature and Need of the Develop. Disabled	3
Total Hours	17

THIRD SEMESTER	
MTH 15 Elem. Stat.	3
OR	
14 HSV Behav. Res. Meth.	
42 HSV Indiv. Prescriptive Prog.	3
43 HSV Meth. of Working with the Develop. Disabled	3
12 HSV Interviewing/Counseling	3
21 HSV Human Service/Developmental Disab. Practicum	4
Total Hours	16

FOURTH SEMESTER	
38 HSV Behav. Modification Tech.	3
45 HSV Resource Awareness & Utilization	3
23 HSV/DD Practicum	6
30 HSV Senior Seminar	
OR	
Elective	3
Total Hours	15

*The first semester is offered alternate years, 1980, 1982, etc.

GERONTOLOGY

This program is designed to prepare the graduate for a number of existing and new entry-level jobs in community based and institutional programs for the elderly.*

Curriculum

FIRST SEMESTER	Hours
3 ENG Crit. Written Exp.	3
7 PSY Intro. to Psych.	3
8 SOC Intro. to Soc.	3
10 HSV Group Proc.	3
1 HSV Intro. to Human Services	3
Total Hours	15

SECOND SEMESTER	Hours
4 ENG Speech	3
8 PSY Psych. of Adjust.	3
BIO 5 The Human Organism	4
13 HSV Intro. to Geront.	3
20 HSV Hum. Ser./ Gerontology Practicum	4
Total Hours	17

THIRD SEMESTER	
12 HSV Interviewing/Counseling	3
14 HSV Behav. Res. Method.	3
15 HSV Physiol. and Patho. of the Elderly	3
21 HSV Human Ser./ Gerontology Practicum	4
Total Hours	16

FOURTH SEMESTER	
25 HSV Activity/Recreation Leadership	2
26 HSV Community Services for the Elderly	2
10 SOC Contemp. Soc. Prob.	3
23 HSV Human Serv./ Gerontology Practicum	6
Elective	3
Total Hours	16

*The first semester is offered alternate years, 1981, 1983, etc.

MENTAL HEALTH

This program option is offered to meet the needs for middle-level workers in the field of mental health.* It is designed to provide the graduate with skills to work, under professional supervision, in a variety of mental health settings — mental health institutes, comprehensive mental health centers and public and private human service community agencies.

Curriculum

FIRST SEMESTER	Hours	SECOND SEMESTER	Hours
3 ENG Crit. Writ. Express.	3	4 ENG Speech	3
7 PSY Intro. to Psych.	3	8 PSY Psych. of Adjustment	3
8 SOC Intro. to Soc.	3	BIO 5 The Human Organism	4
10 HSV Group Processes	3	20 HSV Hum. Serv./Mental Health Practicum	4
1 HSV Intro. to Human Services	3	Elective	3
Total Hours	15	Total Hours	16

THIRD SEMESTER		FOURTH SEMESTER	
14 HSB Behav. Res. Method. *OR* MTH 15 Elem. Statistics	3	10 SOC Contemp. Social Prob.	3
23 PSY Abnormal Psych.	3	23 HSV Practicum	6
11 HSV Psycho-social Eval.	3	30 HSV Senior Seminar	3
12 HSV Interviewing/Counseling	3	Elective	3
21 HSV Hum. Serv./ Mental Health Practicum	4		
Total Hours	16	Total Hours	15

*The first semester is offered alternate years, 1981, 1983, etc.

HUMAN SERVICE PROGRAMS

Course Descriptions

1 HSV Introduction to Human Services—A non-theoretical course designed as an orientation to the national, state and local human service delivery systems. The human service specialty areas, models, and professions will be presented. Interrelationships within all human service and health professions. Professional ethics, confidentiality and relevant professional terminology. Basic helping skills presented and practiced. This course is designed to afford the student more confidence entering the practicum situation and is a prerequisite to all practicum placements. Cr 3.

10 HSV Group Processes—Directed to an understanding of group functioning and leadership. Factors involved in-group cohesions and group conflict. Communication systems, emotional styles, and role functions in groups. Techniques of role playing, psychodrama, and sociodrama. Small group studies itself and puts communication and sensitivity skills into practice. Prerequisite: 7 PSY. Cr 3.

11 HSV Psycho-Social Evaluation—Study and practice of the methods by which individuals deal with other people and social systems. Objective and group psychological tests such as the MMPI, Strong Vocational Interest Blank, etc. studied and used so that the student will be able to practice the techniques of psychological assessment under professional supervision. Prerequisite: 7 PSY. Cr 3.

12 HSV Interviewing-Counseling—Examination of and practice with the techniques of psychological interviewing for the purposes of gathering data and/or modifying human behavior. Current theories and techniques of counseling and psychotherapy. Experience with interviewing and counseling techniques will be gained under professional supervision. Prerequisite: 7 PSY. Cr 3.

13 HSV Introduction to Gerontology—Introduction to theory and practice of gerontology. Course will (1) trace the historic, legal and political aspects of services to the elderly; (2) consider the economic, physiological, psychological adjustments of older persons, as well as the transportation, communication, learning and social aspects; (3) consider the unique cultural,

social and communication needs of ethnic minorities, and (4) provide understanding of the role and function of a gerontology specialist. Prerequisite: 1 HSV. Cr 3.

14 HSV Behavioral Research Methodology—An introduction to the nature, methods, principles and techniques of behavioral research. Emphasis on understanding the journal reports of research and the potential application of research to human services. Cr 3.

15 HSV Physiology and Pathology of the Elderly—Familiarizes the student with the developmental physiological process of aging and commonly occurring pathophysiology of the elderly. The signs and symptoms, diagnosis, treatment and prognosis of geriatric illnesses are presented. Emergency treatment procedures and referral mechanisms are discussed. Prerequisite: BIO 5. Cr 3.

16 HSV Alcohol and Alcoholism—An introduction to the substance alcohol, its use and abuse, historically and in contemporary society. Special attention to: (1) the properties of alcohol which promote its use; (2) the psychological and sociological theories explaining alcohol and drug use; (3) the etiology of alcoholism; and (4) the conceptual models of alcoholism. Cr 3.

17 HSV Alcohol Treatment and Rehabilitation—An introduction to the treatment and rehabilitation process of the alcoholic. In view of the underlying fact that the process of matching patient and treatment is not yet highly developed, attention is given to methods of treatment which will reflect the special situations, backgrounds, and interests of those in contact with the alcoholic. Kinds of intervention and the role of the change-agent will be explored. Prerequisite: 16 HSV. Cr 3.

18 HSV Prevention and Early Detection of Substance Abuse—An indepth course oriented towards understanding the concept of prevention and its relationship to what is already known about alcoholism and other abuse. Will address issues such as: (1) what constitutes responsible use of drugs; (2) how society's attitude towards drugs effects prevention, treatment, etc.; (3) what differences there are in prevention techniques that could be utilized most effectively, i.e., schools, industry, courts, etc. and how to approach these areas, and (5) future areas where research in substance abuse would be most beneficial. Prerequisite: 17 HSV. Cr 3.

19 HSV Drugs: Use and Abuse—An introductory course that approaches the drug issue from both the medical and psycho-social aspects. The pharmacology of drugs and the cultural milieu of their users. Current federal drug laws and their development. The dimensions of legal/illegal use/misuse/abuse of drugs. Prerequisite: HS/CAC Degree candidate or permission of the instructor. Cr 3.

20 HSV Practicum in Human Service—Offers experiential learning in two human service agencies with the student's program option. Students practice skills of objective observing, reporting and recording, interpersonal relationships, interviewing and other helping relationship skills under professional supervision. Weekly group seminars with instructor. Students acquire in-depth understanding of the human service delivery system, and explore topics such as confidentiality, ethics, professionalism, values, and human rights and dignity. Students spend five weeks within three different agencies. Prerequisites: open only to HSV majors; 1 HSV and permission of the instructor. Cr 4.

21 HSV Practicum in Human Service—Second practicum course offers students experiential learning within their program option. Begins a specialization within a functional area (e.g. chemical addiction counseling, child mental health, developmental disabilities, gerontology, and mental health) as a generalist. Students exposed to the delivery system of their human service options with consideration to four elements of the system: prevention, non-residential care, residential care, and aftercare services. Students continue to refine helping relationship skills and acquire functional specialization. Weekly conferences provide interaction sessions in which students share experiences, and demonstrate acquisition of helping skills. Students assigned to human service agency within their program option. Prerequisites: open only to HSV major, 20 HSV and permission of the instructor. Cr 4.

23 HSV Practicum in Human Service—The third sequential experiential learning practicum course. Students spend entire semester in a human service agency related to their chosen functional area. Students gain a deeper understanding of the delivery system within their speciality area and an increased sophistication in helping relationship skills. A weekly seminar provides interaction sessions in which the student will share experiences and demonstrate acquisition of the helping and change-agent skills. Prerequisites: open only to HSV major; HSV 21 and permission of the instructor. Cr 6.

25 HSV Activity/Recreational Leadership—The procedures, practices, and aids for organizing and conducting programs to maintain the physical, social, and emotional functioning of the elderly. Existing programs of public and private agencies, organizations, and community groups will be examined. Prerequisite: HSV 13 or permission of the instructor. Cr 2.

26 HSV Community Services for the Elderly—Descriptions, organizational approaches, and financing alternatives for a wide range of social and rehabilitation services for the elderly. Federal and state legislation such as Social Security, Medicare/Medicaid, and the Older Americans Act covered in depth. Prerequisite: 13 HSV or permission of the instructor. Cr 2.

30 HSV Senior Seminar—Students select from a series to be arranged by the coordinator each spring semester. Topics may include such specialities as behavioral engineering, community service methods, mental health methods, activity therapies, corrections. Professionals with specialities in topic area will teach the seminars. Reading, discussions and practical experience integrated in the seminar. Prerequisite: open to program majors, or with permission. Cr 3.

31 HSV Applied Group Process—A treatment of the most widely used applications of group process. Acquisition of relevant theory and the development of specific skills in group process facilitated through a training laboratory approach. Areas to include: (1) encounter groups, (2) group counseling, (3) group process consultation in organizations, (4) human relation skill development, and (5) conflict management. Prerequisite: 10 HSV and permission of the instructor. Not open to first-year students. Cr 3.

41 HSV Nature and Needs of the Developmentally Disabled—An overview of developmental disabilities. The physiological, psychological, educational, and familiar characteristics of developmental disabilities. Mental retardation, cerebral palsy, epilepsy, autism, and other handicapping conditions closely related to mental retardation. The historical development of treatment for the developmentally disabled. Current definitions and concepts. The practicum site will be used to assist in the identification and knowledge of the developmentally disabled. Prerequisite: 1 HSV and/or permission of instructor. Cr 3.

42 HSV Individual Prescriptive Programming—Prescriptive programs throughout the entire life process. Complete delivery system of developmental disability agencies and institutions. Course integrated with the practicum experience. The functions of diagnostic team members, individual prescriptive program team members. Develops understanding of the team responsibilities. Special testing and evaluative procedures. Cr 3.

43 HSV Methods of Working with the Developmentally Disabled—Methods to improve physical, social, educational, and perceptual-motor skills of the developmentally disabled. Recreational and leisure time resources within the community. Social adjustment of the developmentally disabled. Basic tenets of personal and social guidance. Students expected to directly apply course content to their practicum setting. Prerequisite: 41 HSV and/or permission of instructor. Cr 3.

44 HSV Behavior Modification Techniques—Concepts and techniques of behavior modification as it applies to the developmentally disabled. The practicum site supplements classroom experience. Identifying and recording behavior, outlining consequences, and identifying and implementing procedures to modify behavior. Students expected to develop modification program which could effectively be used at their practicum site. Cr 3.

45 HSV Resource Awareness and Utilization—Community, regional, state and federal resources discussed with the goal of establishing a better awareness of resource utilization. Interrelationships between public and private programs, development of program financing, and discussion of program models. Current provisions and programs relative to educational planning. Development of an in-depth awareness of sheltered workshop and boarding-home programs. Guest lecturers from local and state agencies. Open discussion. Cr 3.

50 HSV Child Mental Health—An interdisciplinary applied course that integrates and builds on preliminary courses of the physical and social sciences. Expands on the physical, emotional, intellectual and social growth processes; addresses positive mental health, and explores prevention, detection and rehabilitation programming. Prerequisites: 5 BIO, PSY 9 or permission of the instructor. Cr 3.

51 HSV Adolescent Mental Health—An interdisciplinary applied course which integrates physical, emotional, intellectual and social aspects of adolescent development. An exploration of prevention, detection and rehabilitation programs. Emphasis on interrelationships of the physiological, psychological and cognitive systems. Prerequisite 50 HSV. Cr 3.

98 HSV Mental Health/Human Service Practicum—Experiential learning within the broad area of human services. Students exposed to specific knowledge and skills within their practicum placement which may be drawn from the wide range of human services. Prerequisite: open only to MHT/HSV degree candidates; 1 HSV; and permission of instructor. Cr 4-6 divided between field experience and seminar.

99 HSV Special Topics in Human Services—An opportunity to acquire specialized skills within human service disciplines. Topics vary from semester to semester, depending on expressed interest or identified needs. Fulfills specialized needs of student population. Prerequisite: permission of the instructor. Cr 3.

*Note: 20, 21, 23 HSV practicum courses required in all programs. The program option determines the type of agency or facility utilized for experiential learning.

Practicum Application and Registration—Written application (not to be confused with registration) for all Human Service Practicum placements must be made one month in advance of each placement. This is essential in order to ensure high quality field placements for all students.

University of Southern Maine School of Nursing Baccalaureate Program in Nursing—The University of Southern Maine School of Nursing offers a baccalaureate nursing program with an upper division major for professional study. Each nursing student must complete 120 credits which include nursing, general education, liberal arts and other supportive courses. Upon successful completion of the program the student is awarded a Bachelor of Science degree with a major in nursing, and is eligible to take the State Board Examination for R.N. licensure. The School of Nursing is approved by the Maine State Board of Nursing and is accredited by the National League for Nursing.

Admission Policy

Students interested in pursing a Bachelor of Science in nursing first must be admitted to the University of Maine for lower division study as prenursing candidates. Admission of prenursing candidates to the School of Nursing is determined by the School of Nursing Admissions Committee. Prenursing candidates will be evaluated for admission to the nursing major on the basis of their grade point average, academic standing, standardized test results, letters of recommendation, a personal interview, and successful completion of all prerequisites (63.5 credits) outlined in the University of Southern Maine catalog. (See University of Southern Maine Catalog or University of Southern Maine School of Nursing Brochure).

Admission Procedure

Applicants for admission to the School of Nursing must:

1. Have successfully completed a minimum of 30 credits in the prescribed prerequisites.
*2. File an application with the School of Nursing by November 15 of the year prior to desired admission to the upper division nursing major.

The following documents must be received by the School of Nursing Admissions Committee prior to January 15 of the year in which admission to the School of Nursing is desired:

1. Official transcripts of all college courses completed.
2. Current scores (taken within the last five years) on the Scholastic Aptitude Test.
3. Three letters of recommendation.
4. The completed medical History and Physical Examination Form.

Courses from other colleges or universities are evaluated by the Admissions Office of the University of Southern Maine for transfer credits.

Applications cannot be processed until all the above documents have been received. After receipt of all the appropriate documents, the Admissions Committee reviews the applicant's credentials. A personal interview is then scheduled. When the Committee has acted upon an application, the applicant is advised by letter of the Committee's decision prior to Preregistration of the Fall Semester. All admissions are contingent upon successful completion of all prerequisites.

Applicants planning to take senior level courses at an extended site please see University of Southern Maine Catalog or University of Southern Maine School of Nursing Brochure.

Prerequisites for admission to the University of Southern Maine School of Nursing can be taken at the Orono Campus. The upper division nursing major is offered at the University of Southern Maine and selected extended sites.

For further information, please refer to the University of Southern Maine Catalog or University of Southern Maine School of Nursing Brochure available on all campuses of the University of Maine.

College of Business Administration

W. Stanley Devino, Dean

The undergraduate program in the college is accredited by the American Assembly of Collegiate Schools of Business. The AACSB is recognized by the Council on Postsecondary Accreditation and by the U.S. Office of Education, as the sole accrediting agency for bachelors and masters degree programs in business administration.

The College of Business Administration offers a four-year program in the major area of business administration. Upon successful completion of the prescribed curriculum the student is awarded the bachelor of science degree.

The college also provides a graduate program leading to the degree of master of business administration. The graduate offerings of the College of Business Administration are described in the Graduate School Catalog.

UNDERGRADUATE PROGRAM

The primary objective of the undergraduate program in business administration is to develop the student's abilities to assume the responsibilities of business management. The program is aimed at providing the broad training necessary for successful business management in a rapidly changing economy. No attempt is made to provide detailed specialized training in particular business tasks. The program aims, rather, at developing skills and attitudes of mind that will enable the student to cope successfully with the changing problems of business management in the years ahead. Implementation of this program takes place in three general phases: First, the students acquire broad training in the liberal arts and sciences for the necessary foundattion upon which their future education will build. Second, the students pursue a program of study designed to provide them with an understanding of the major functional areas common to most business operations and with a knowledge of certain fields which are particularly relevant to the study of business management. This is referred to as the "core" program and includes basic courses in accounting, economics, finance, the legal environment of business, marketing, and general management. Third, the students undertake to acquire a deeper knowledge of the major field which they have selected. This is done largely during the senior year and is accomplished by taking 15 credit hours of work beyond the introductory course in the chosen field. The four major fields of concentration in which advanced work may be done are accounting, finance, marketing, and management.

GENERAL INFORMATION

Admission—Students are usually admitted to the College of Business Administration as first-year students in the University. For the specific requirements for admission see the Admission section. All deficiencies in entrance requirements must be removed before registering for the sophomore year. Students who transfer from other colleges with advanced standing must satisfy all basic entrance requirements within one year.

Transfer Credit—Under the accreditation standards of the American Assembly of Collegiate Schools of Business, no transfer credit is granted for business courses taken during the freshman and sophomore years, with the exception of six semester hours for Principles of Accounting and three semester hours for The Legal Environment of Business. However, a transfer student from an institution designated as regionally accredited who has taken a business course at the lower division level which is offered at the upper division level at the University of Maine at Orono may request validation of said course. The method of validation consists of an examination procedure to demonstrate acceptable proficiency consonant with the overall educational experience required of all students in the College of Business Administration. Also, no transfer credit is granted for any course completed at another accredited institution in which grades below C have been received. Responsibility for evaluating course work for which transfer credit is requested rest with the Director of Admissions and the Dean of the College.

Students from other campuses of the University of Maine who wish to transfer to the College of Business Administration must present an academic record that meets at least the minimum standards of quality established by the University. Also, they are required to complete at least one full year of academic work as students in the College of Business Administration.

CHANGE OF COLLEGE POLICY AT UMO
(Effective February 9, 1979)

1. Students in baccalaureate programs from other Colleges at UMO—minimum grade point requirement (includes students in the BCC Liberal Studies program) 2.5
2. Students in two-year programs—minimum grade point requirement 2.8

Senior Year in Residence—To receive a B.S. degree in Business Administration at the University of Maine at Orono, a student must fulfill the senior year residency requirement. This requirement is that the last 30 degree hours in the academic program must be completed at the University of Maine at Orono.

Graduation Requirements—Completion of the required work of the College of Business Administration leads to the degree of bachelor of science. All students are required to complete 120 degree hours, exclusive of credit for basic military training.

Students must have a 2.0 accumulative average to graduate. The accumulative average is figured as follows:

Total hours taken divided into
total quality points received.

All course work taken in Business (Ba) and Economics (Ec) must be completed with a 2.0 (C) average for a student to be eligible for a degree.

The required course work for the B.S. in Business Administration is given below:

B.S. IN BUSINESS ADMINISTRATION PROGRAM

A. General Foundation Subjects—48 credits

1. *Humanities* and *Fine Arts* (18 credits)
   Eh 1—College Composition
   Eh 17—Advanced Professional Writing
   Sc 3—Fundamentals of Public Speaking
   At least three of the remaining 9 credit hours must have an Eh designation. The remainder may be selected in such fields as: art, the classics, English composition, foreign languages, journalism, literature, music, philosophy, speech, and theatre.
2. *Behavioral and Social Sciences* (18 credits)
   Ec
   Py 1—General Psychology
   An economics course beyond Ec 10 must be taken, *but no more than one*, to fulfill this requirement. The remaining credits may be taken in such fields as: anthropology, history, modern society, political science, psychology, and sociology.
3. *Mathematics and Computer Science* (12 credits)
   Ms 13/14—Mathematics for Business and Economics*
   Ms 15—Introduction to Statistics for Business & Economics**
   Cs 81—Computer Programming

*Ms 26 and Ms 27 may be substituted for Ms 13/14.
**Ms 131 may be substituted for Ms 15.

B. Core Requirements in Business—33 credits

Ba 9 Principles of Accounting I
Ba 10 Principles of Accounting II
Ba 30 The Legal Environment of Business
Ba 123 Principles of Management and Organization
Ba 130 Political and Social Environment of Business
Ba 147 Business Information Systems
Ba 151 Business Finance
Ba 159 Administrative Policy and Business Environment (Seniors only)

Ba 160 Production and Operations Management
Ba 163 Marketing
Ec 10 Principles of Economics

C. **Major Field—15 credits**

The major field is composed of 15 credit hours to be required by each functional area subject to approval of the faculty. All courses must carry a Ba or Ec designation.

1. *Accounting* (15 credits)

Required:

Ba 141 Intermediate Accounting I
Ba 142 Intermediate Accounting II
Ba 143 Advanced Accounting I
Ba 145 Cost Accounting I
Ba 148 Auditing

Accounting majors are strongly encouraged to take the following courses as free electives:

Ba 144 Advanced Accounting II
Ba 146 Cost Accounting II
Ba 185 Accounting Control Systems

2. *Finance* (15 credits)

Required:

Ba 141 Intermediate Accounting I
Ba 150 Financial Institutions
Ba 156 Investment Strategy
Ba 158 Corporate Treasury Dynamics

and any *one* of the following:

Ba 145 Cost Accounting I
Ba 146 Cost Accounting II
Ec 171 Public Finance and Fiscal Policy
Ec 172 State and Local Government Finance
Ec 173 Price Theory
Ec 175 Industrial Organization

3. *Management* (15 credits)

Required:

Ba 161 Personnel Management and Industrial Relations
Ba 164 Dynamics of Organization and Behavior
Ba 168 Seminar in Contemporary Management Problems

and any *two** of the following:

Ba 125 Business Logistics
Ba 162 Labor-Management Relations
Ba 199 International Management
Ec 133 Labor Economics
Ec 139 International Trade and Commercial Policy
Ec 173 Price Theory

*at least *one* of the two must have a Ba designation.

4. *Marketing* (15 credits)

Required:

Ba 125 Business Logistics
Ba 165 Advertising
Ba 167 Sales Management
Ba 170 Managerial Marketing

and any *one* of the following:

Ba 150 Financial Institutions
Ba 161 Personnel Management and Industrial Relations
Ba 164 Dynamics of Organization and Behavior
Ba 166 International Marketing
Ba 168 Seminar in Contemporary Management Problems
Ba 169 Marketing Research
Ba 171 Consumer Behavior

D. **Free Electives—24 credits**

NOTE: No more than 21 of the 24 hours may be taken in Ba and/or Ec courses.

SPECIMEN CURRICULUM

Freshman Year

	FALL SEMESTER		SRING SEMESTER
Ec 10	Principles of Economics		Economics Elective
Eh 1	College Composition		English Elective
Ms 13	Math for Business & Economics	Ms 14	Math for Business & Economics
Py 1	General Psychology	Sc 3	Fund. of Public Speaking
	Free elective		Social Science Elective

Sophomore Year

Ba 9	Principles of Accounting I	Ba 10	Principles of Accounting II
Ms 15	Intro. Statistics-Bus & Econ	Ba 30	Legal Environment of Business (either semester)
	Humanities Elective	Cs 81	Computer Programming
	Social Science Elective		Humanities Elective
	Free Elective		Social Science Elective

Junior Year*

It is recommended that the following courses be completed during the junior year: Ba 123, Ba 147, Ba 151, Ba 160, Ba 163, one humanities elective, Eh 17, one social science elective, and two free electives.

Senior Year

It is recommended that the following courses be completed during the senior year: five major field courses, Ba 130, Ba 159, and three free electives.

*It is possible for the student to take a major field course during the spring semester if he has the necessary prerequisite(s). *Accounting students are required to take Ba 141 and Ba 145 during the fall semester of their junior year.*

HONORS PROGRAM

Jacob Naor, Honors Secretary

Freshmen of marked academic ability are invited to apply to the secretary for admission to the sequence of honors courses described below. Qualified students may be admitted at any stage of the Honors Program up to the opening of the junior year. Of the courses listed below, Hr 41, 45, 47, and 48 are taken in common with students from other colleges within the University. These courses, plus Hr 151, 152 and 153.154 constitute the core of the Program. Hr 41, 45, 47, and 48 meet the College of Business Administration requirements in the area of humanities and fine arts or free electives. Additional information about the Honors Program and a full description of courses will be found in the Honors section of this catalog.

Hr 41. Honors Freshman Seminar
Hr 45. Honors Colloquium
Hr 46. Honors Summer Readings
Hr 47.48. Honors Group Tutorial
49. Honors Summer Readings
60. Honors Independent Study
61. Honors Independent Research
62. Honors Independent Research
63. Honors Specialized Seminar
150. Honors Seminar
151.152 Honors: Specialized Studies
153.154. Honors Thesis
170. Honors Distinguished Lecture Course

COURSES OF INSTRUCTION

Professors Alpander, Devino, Forsgren, M. McClure; Associate Professors Bartlett, Cooke*, J. McClure, J. Naor; Assistant Professors Alberni, Fannin, Gautschi, Gilmore, Herzog, McConnell, Punj*; Instructors (part-time) Kobritz, Thorne, Lecturer Ingalls
*On leave 1980-81

Courses numbered 1 to 99 are undergraduate courses. They are open to graduate students but credit earned in these courses may not be used to satisfy advanced degree requirements. Courses numbered 100 to 199 are upperclass undergraduate courses which may be used by the graduate student's advisory committee. Courses numbered 300 to 399 are graduate level courses which may be taken only by students admitted to the Graduate School.

100-level Course Policy—College of Business Administration students, as well as all other students, must have *junior standing* (53 or more degree hours) in order to take all Ba undergraduate courses except Ba 9, Ba 10, and Ba 30. Students are strongly advised to take Ba 9, Ba 10, and Ba 30 during their sophomore year (these 3 courses are *not* open to freshmen).

Courses in Business Administration (Ba)

9. Principles of Accounting I—An introductory course in accounting covering the fundamental accounting equation, the basic principles of accounting measurements, the accounting cycle, the construction of financial statements and asset analysis and valuation. Prerequisite: sophomore standing. Cr 3.

10. Principles of Accounting II—A continuation of introductory accounting, covering analysis and valuation of liabilities and stockholder's equity, basic principles of consolidated statements and the statement of changes in financial position, cost accumulation methods and management decision-making. Prerequisite: Ba 9 (sophomore standing). Cr 3.

30. The Legal Environment of Business—An examination of fundamental legal concepts and their application to the business community. Among the topics discussed are the evolution of law and its underlying conceptual framework from which legal rules and principles of business develop. Selected legal cases will be critically analzyed and discussed. Prerequisite: Ba 9 or permission. Cr 3.

100. Field Experience-Cooperative Education—From one (1) to six (6) semester hours of degree credit will be granted for field experience in business and managerial fields provided it is relevant to the student's educational development and career goals. Prior approval of the instructor is required and prior approval of the precise number of credits is also necessary. Students will not be granted credit either retroactively or for field experience courses taken at another university or another campus of this university. A detailed written plan concerning the field experience proposal must be presented by the student to the instructor so that a decision can be made on admission to the course. Prerequisite: junior or senior in the College of Business Administration and permission of instructor. Cr 1-6.

123. Principles of Management and Organization—Analysis of the internal organizational structure and the process of management in business enterprises both domestic and international. Attention is focused upon concepts, methods, and techniques of planning, organizing, directing, and controlling the functions of the modern manager. The impact of these processes upon effective interpersonal relations will be highlighted. Prerequisite: Ec 10. (Junior standing) Cr 3.

125. Business Logistics—An introduction to the elements of the logistical system includes consideration of transportation modes, plant and warehouse location, inventory size determination, etc. Cases and problems are utilized to sharpen analytical techniques. Final attention turns to the total cost approach to logistical system analysis and decision-making. Prerequisite: Ba 123, 163. Cr 3.

130. Political and Social Environment of Business—Study of American business in a changing socio-political environment. Topics considered in the course include (1) the nature of the relationship between business and other American institutions, (2) the influence of business on public values and policies, and (3) emerging characteristics of the socio-political environment. Prerequisite: Ec 10 and junior standing. Cr 3.

141. Intermediate Accounting I—Principles regarding the valuation and recording of working capital items and noncurrent items; capital stock and surplus; statement analysis. Prerequisite: Ba 9, 10. Cr 3.

142. Intermediate Accounting II—A study of the accounting and valuation problems of assests and a consideration of current issues and controversies in financial accounting. Prerequisite: Ba 141. Cr 3.

143. Advanced Accounting I—Principles, theory, and procedures of parent and subsidiary accounting. A comprehensive study of consolidated statements, affiliation structures, and consolidations and mergers. Also includes home office and branch accounting. Prerequisite: Ba 141. Cr 3.

144. Advanced Accounting II—Application of accounting principles to accounting problems arising in connection with: partnerships, joint ventures, insurance, consignments, installment sales, statement of affairs, receiverships, estates and trusts, statement of realization and liquidation, foreign exchange, and governmental and institutional accounting. Prerequisite: Ba 141. Cr 3.

145. Cost Accounting I—The principles and methods of job order costs, including inventory control and pricing, labor and analysis and allocation of factory overhead. Principles and practices of process cost accounting. Prerequisite: Ba 9, 10. Cr 3.

146. Cost Accounting II—A comprehensive study of joint and by-product costs, estimated and standard costs, distribution and differential costs. Budgeting. Analysis of cost structure and management use of standards. Prerequisite: Ba 145. Cr 3.

147. Business Information Systems—The role of information systems and data processing in business planning and control. Technology of information systems, economics of information, planning, decision making and control in business organizations. Simulation and other computer applications in business including applications of GPSS and COBOL programming. Prerequisite: Ms 15, Cs 81. (Junior standing) Cr 3.

148. Auditing—The systematic verification of financial statements including a study of the responsibilities, liabilities and ethics of the independent public accountant. Prerequisite: Ba 141. Cr 3.

150. Financial Institutions—The operations and economic roles of financial institutions: commercial banks, investment houses, and investment markets; savings and insurance institutions; and governmental agencies. An institutional introduction to the fields of private and public finance. Prerequisite: Ec 10, or permission.(Junior standing) Cr 3.

151. Business Finance—This course deals with the promotion, organization, and financing of the single proprietorship, partnership, and corporation. It also utilizes advanced cases and problems related to the above topics. Prerequisite: Ec 10, Ba 9. (Junior standing) Cr 3.

156. Investment Strategy—Analysis and selection of stocks and bonds as part of the investor's approach to financial security. The relationships between the securities markets, the total money market and the general economy are examined. Prerequisite: Ec 10 (Junior standing). Cr 3.

158. Corporate Treasury Dynamics—The counterflows of cash between the corporate unit and the money market due to seasonal, cyclical, and secular demands. Numerous approaches to debt limit determination. Total problem of making optimal financing decisions in specific corporate and bank management settings. Prerequisite: Ba 151. Cr 3.

159. Administrative Policy and Business Environment—Administrative decision making and policy setting, with consideration of social and political forces and ethical values. Seniors only. Prerequisite: Ba 123, 147, 151, 160, 163. Cr 3.

160. Production and Operations management—The place of production planning and control in an industrial organization and its relation to the actual production procedure. Problems in design, marketing, forecasting, capacity evaluation and quality control which are interwoven with those of production and inventory management. Prerequisites: Ba 123. (Junior standing). Cr 3.

161. Personnel Management and Industrial Relations—The personnel management systems of private and public organizations are surveyed from the interdisciplinary perspective of modern industrial relations. The use of an integrated behavioral, quantitative and systems approach permits an applied synthesis of the social sciences which analyze the employment relationship. Prerequisite: Permission or the equivalent of Ec 10, and Py 1. (Junior standing) Cr 3.

162. Labor-Management Relations—The labor-management systems of the private and public sectors are surveyed from the interdisciplinary perspective of modern industrial relations. The nature and characteristics of labor-management relations are considered from such perspectives as the structural, historical, international, legal, psychological, and economic. (Junior standing). Cr 3.

163. Marketing—Problems of distribution for representative industrial and consumer goods, including merchandising policies, selection of distribution channels, price policies, and advertising and sales promotion methods. Prerequisite: Ba 9, Ec 10. (Junior standing) Cr 3.

164. Dynamics of Organization and Behavior—An analysis of business organization and the problems of administrators in an interpersonal setting. Primary emphasis is on the findings of behavioral sciences which are particularly relevant to the management of economic enterprises. Also an examination of interdisciplinary approaches to human relations and adjustment problems in modern organizations. Motivation, leadership, and organization theory as related to work and productivity, and associated topics are also covered. Prerequisite: Ba 123. Cr 3.

165. Advertising—The place of advertising in the marketing program. Business cases are analyzed to determine those situations in which advertising may be profitably employed to stimulate primary and selective demand for industrial and consumer goods and services. Prerequisite: Ba 163. Cr 3.

166. International Marketing—Focuses on marketing principles and strategies that will assist in the successful conduct of international business operations. Differing business environments will be examined in order to sensitize students to needed changes in marketing strategies. Prerequisite: Ba 163. Cr 3.

167. Sales Management—An analysis of the problems facing marketing management in formulating sales policy and in managing the sales organization. Prerequisite: Ba 163. Cr 3.

168. Seminar in Contemporary Management Problems—Seminar in developments in the behavioral and management sciences, the development of management thought, and critical issues in organizational theory, with special reference to industrial application. In addition, students will conduct library research, or field work of considerable depth, in select managerial topics. Prerequisite: Ba 164. Cr 3.

169. Marketing Research—A consideration of marketing research as a tool in solving problems of production and distribution. Emphasis is upon problem formulation, exploratory research, research design, basic observational and sampling requirements, data analysis, interpretation, and sampling. Prerequisite: Ba 163 and Ms 15. Cr 3.

170. Managerial Marketing—A managerial approach emphasizing the integration of marketing, as an organic activity, with other activities of the business firm. Recognition of and appreciation of the problems encountered by top marketing executives in modern business. Prerequisite: Ba 163. Cr 3.

171. Consumer Behavior—An analysis of consumer purchase decision processes. An exploration of existing consumer behavior models and their role in the formulation and implementation of marketing strategies. The psychological, sociological and cultural dimensions of buyer behavior; the current state-of-the-art inconsumer research, including the findings from empirical tests of buyer behavior models. Prerequisite: Ba 163. Cr 3.

176. Federal Tax Reporting—Federal tax laws as they affect individuals, partnerships, corporations, and estates. An opportunity is given the student to become familiar with tax forms. Prerequisite: Ba 9, 10, 145. Cr 3.

185. Accounting Control Systems—An upper level management accounting course emphasizing accounting as a system for information and control. Particular emphasis on the organizational and behavioral implications of accounting. Prerequisite: Ba 123 and 145. Cr 3.

190. Problems of Small Business—Aspects of management uniquely important to small firms. Develops understanding of the economic and social environment in which the small concern functions. Student practice in decision-making on types of problems that small businessmen face. For students who wish to explore opportunities for operating their own small businesses, and to those who expect to have small businesses as customers or suppliers. Problems relevant to small business operations in Maine stressed. Prerequisite: Ba 123, 151, 163 and senior standing with permission. Cr 3.

191. Dynamics of Small Enterprises—Course assumes a broad management background at the undergraduate level and understanding of basic problems of small business and consulting

techniques developed in Ba 190. That background is focused on the special problems of entrepreneurship, venture capital, and growth management provided through the Small Business Administration's Small Business Institute program. Students will work in or manage teams in problem solving. Prerequisite: Ba 190. Cr 3.

199. International Management—Management problems of organizations whose interests extend across international boundaries. Significance of cultural traditions and social structures for the conduct of business enterprise. International similarities and difference in managerial functions, structure, and processes. Prerequisite: Ba 123 or permission. (Junior standing). Cr 3.

301. Quantitative Methods and Information Systems for Business Decisions—Cr 3.

302. Behaviorial Analysis for Administrative Decisions—Cr 3.

303. Managerial Economics—Cr 3.

320. Managerial Accounting—Cr 3.

321. Accounting for Planning and Control—Cr 3.

330. Financial Management—Cr 3.

331. Investment Management—Cr 3.

332. Management of Financial Institution—Cr 3.

340. Production Management—Cr 3.

341. Operations Research—Cr 3.

345. Industrial Relations and Personnel Management—Cr 3.

346. Collective Bargaining—Cr 3.

347. Organizational Behavior in Business—Cr 3.

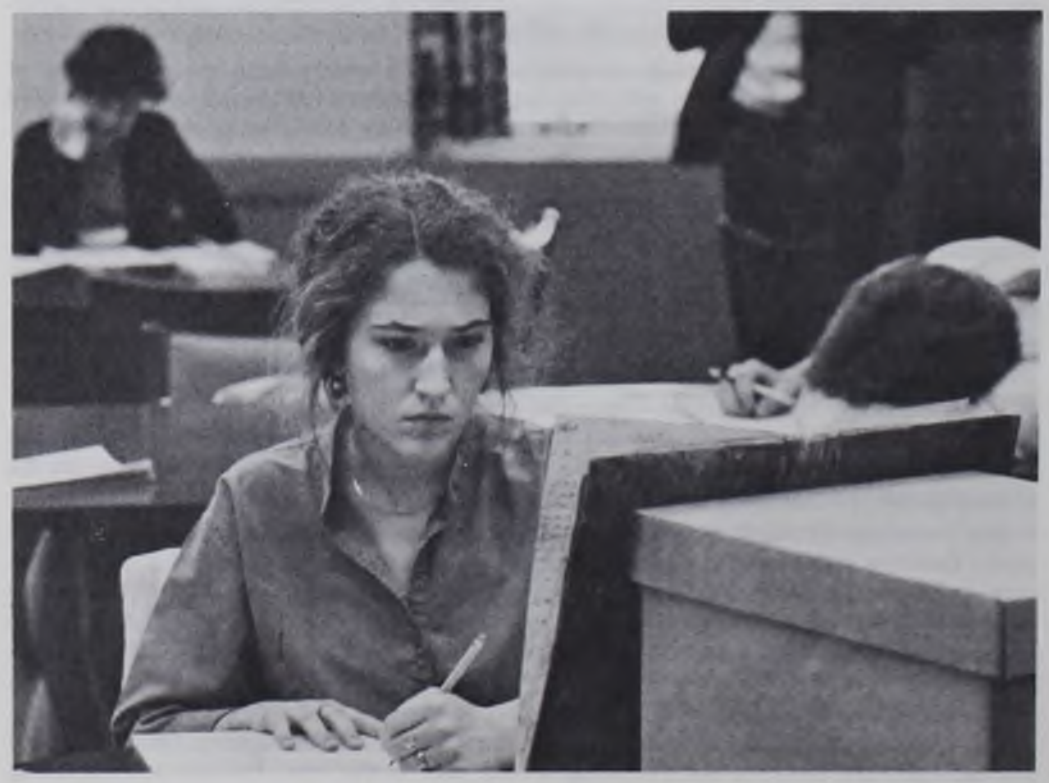
350. Marketing Management—Cr 3.

351. Market Research and Analysis—Cr 3.

352. Business Logistics—Cr 3.

353. Consumer Behavior for Managerial Decision Making—Cr 3.

397. Management Policy—Cr 3.



College of Education

Robert A. Cobb, Dean

The College of Education offers four-year programs designed to prepare elementary, junior and senior high school teachers and teachers of physical education, health, recreation, music, special education, and art. Alternative career options in the following areas are possible: child care, child advocacy, community service, day care centers, substance abuse. Within the four-year undergraduate program a student may start his preparation for such positions as a specialist in reading, guidance counselor, principal, supervisor, and school administrator. These programs are usually completed during a period of graduate study.

The College of Education also provides instruction, on a service basis, in the professional subjects essential to the preparation for teaching, to undergraduate students from other divisions of the University, and also for students registered with the Faculty of Graduate Study.

GENERAL INFORMATION

The College of Education concerns itself with those students who are planning for a career in the field of education. All of its undergraduate programs are designed so that each student will include a substantial amount of college work in general education, a concentration of academic work closely related to the area of special teaching interest, and basic professional work in education.

ADMISSION

Students ordinarily are admitted to the College of Education as first-year students in the four-year program. The specific admission requirements are given in the Admission section of this catalog. A student admitted with advanced standing must satisfy all basic entrance requirements during his first year in the College of Education.

Bangor Theological Seminary—Regularly enrolled students in the College of Education may register for courses at the Bangor Theological Seminary, not to exceed six credit hours per semester, without payment of additional fees. The College of Education extends a like privilege to students regularly enrolled at the Bangor Theological Seminary. Such registrations must have the approval of the deans of both institutions and the instructors involved. Credit for courses so taken will be where he is enrolled.

While enrolled at the Bangor Theological Seminary, a student may, with the approval of his dean and the admissions office of the University, also register as a special student in the College of Education on the established fee basis for such courses. Work so taken, if it does not substitute for or duplicate courses taken in the seminary program, may be counted as advanced standing credit toward the degree in the event a student later registers for a degree program at the University.

DESCRIPTION OF THE FOUR-YEAR PROGRAM

The booklet, "Four-Year Programs in the College of Education," describing in detail the special requirements in general education, the courses needed for the development of various teaching fields, and the required work in professional education, has been prepared for students who desire to enter education.

A copy of this booklet may be obtained by writing to the Director of Admissions or the Dean of the College of Education.

ADMISSION WITH ADVANCED STANDING

Students from other institutions who have already completed a portion of college work, or who desire to change their professional plans and enter education, are invited to apply for admission by transfer. Each case will be considered on its own merits. When such students are accepted, they will be given advanced standing in the College of Education for work already completed which meets the established standards of quality and the specific course requirements of the program to which they are seeking admission.

Summer Session and Continuing Education Students—Students whose only work in the College of Education has been or will be in the Summer Session or Continuing Education Division program are strongly urged to apply for admission to the University exactly as they would if

they expected to apply for resident work during the regular school year. This recommendation applies both to students who expect to work for a degree in the various colleges of the University and also those who have not yet fully decided on the matter. **At least 30 credit hours of Orono courses must be completed to receive a degree from the University of Maine at Orono.**

Among the advantages of being admitted to the University are immediate assignment of a major adviser to counsel on registration, requirements, etc.; and eligibility for guidance and counseling service. Students who expect their work to be in the Summer Session should apply before their first registration; students whose first work is to be by continuing education class should apply during their first course.

Application for admission should be made directly to the Director of Admissions, University of Maine. (See sections immediately above.)

GRADUATION REQUIREMENTS

The completion of the required work of the College of Education leads to the degree of bachelor of science in education (B.S. in Ed.)

A minimum of 120 degree hours of required college work, exclusive of credit for basic military training (if elected), is required for graduation. In addition, each student must accumulate a total number of "grade points" equal to twice the number of hours in which he receives grades. Grade points are computed by multiplying each hour of the letter grade by the factor as follows: A by 4, B by 3, C by 2, and D by 1.

Included in the 120 semester hours required for graduation for those who follow the *elementary teacher* program are a minimum of 44 degree hours in general education, 33 degree hours of courses in professional subjects, and 24 hours in an academic field of concentration.

In elementary education, 60 hours of liberal education must be completed with a 2.0 (C) average.

Those who follow the *secondary teacher* program are required to complete a minimum of 36 degree hours in general education, 18 degree hours in professional education, and 51 to 62 degree hours in the field of concentration (depending upon field of concentration), plus electives.

Students who expect to qualify to teach in a *specialized field*, such as the physical education program, will be required to complete a 42-hour academic teaching area as their field of concentration. In addition, students who follow the physical education program will be required to complete an 18-hour restricted concentration. Those who follow the art education program are required to complete a 24-hour academic specialization in addition to other specialized subjects in art. Alternative career options are possible in the elementary and secondary program. Details will be found in the folder outlining the complete program, which may be obtained by writing to the Dean of the College of Education.

All courses taken in the student's academic teaching field and his professional work must be completed with a 2.0 (C) average to be eligible for a degree. In addition, a student must likewise acquire a 2.0 (C) average in all work taken before the degree may be awarded.

General Education Subjects Required—Information concerning the specific courses required in general education is available from the Office of the Dean. The subjects are:

English
Speech
Social Studies
Science and Mathematics
Psychology
Fine Arts and Humanities

In addition to their regular subjects, teachers generally participate in the direction of student activities such as music, debating, dramatics clubs, and games. Each student in the College of Education should develop some proficiency in at least one of these fields.

Professional Subjects Required—The professional subjects required for a degree from the College of Education meet the current state requirements for a teaching certificate.

The required professional subjects are designed to acquaint the student with the general aims of education and the techniques and principles of teaching. These courses are arranged so that they culminate in the course Observation and Supervised Student Teaching.

RESIDENCE REQUIREMENTS

A minimum of 30 semester hours of credit must be earned as a student in the College of Education to qualify a candidate for a degree. This requirement may be met by one academic

year of residence or by attending Summer Sessions; however, regularly enrolled students in the University who wish to transfer to the college may find it necessary to complete additional semesters to meet degree requirements. For students enrolled in Continuing Education Division and Summer Session courses, the 30 hours of residence credit may be obtain over an extended period of time and need not be continuous. Work taken in the C.E.D. is considered resident credit for undergraduate students in the College of Education. Off-campus students, before enrolling for a course, should ascertain from the Dean of the College of Education the amount of such work that is allowed toward fulfilling the requirements for the degree.

Exceptions to these rules will not be permitted except by a vote of the faculty.

EDUCATION COURSES IN THE SUMMER SESSION AND IN THE CONTINUING EDUCATION PROGRAM

Numerous education courses are offered during the Summer Session and by class extension through the Continuing Education Division. Detailed information regarding the Summer Session and the Continuing Education course offerings may be obtained by communicating with the director, Edward Hackett, Merrill Hall, Orono, Maine 04469.

DOUBLE MAJORS

The student wishing to choose a double major across College lines must normally make a declaration of intent in the sophomore or junior year. The double major must be in two distinct and separate majors. All requirements in both Colleges and both majors must be fulfilled including major requirements for work required outside the Department. Students intending to become candidates for such double majors *must* declare their intent to the Deans of both Colleges no later than the beginning of *their junior year*.

THE HONORS PROGRAM

With the cooperation of the other divisions, the College of Education participates in the University Honors Program. During their freshman year, students of high academic standing and exceptional promise are considered for enrollment in honors courses. Students who do not enter the program during the spring semester of their freshman year may, if qualified, be selected to begin honors study the following fall. Although as a rule students are invited to become candidates for the program by a selection committee, a student himself may initiate his candidacy by requesting a written endorsement from his academic adviser addressed to the committee. Information about this program may be obtained from Prof. John Lindlof, Education Building.

A more detailed statement of the University Honors Program is given elsewhere. (See Index.) Honors (Hr) courses are as follows:

41. Distinguished Freshman Seminar—Limited to Distinguished Maine Students and to a limited number of other students, by invitation. Discussions and demonstrations displaying the range and nature of the Liberal Arts and Sciences. Cr 3.

45. Honors Colloquium—Readings and discussions on the basic concepts of Western civilization. Cr 3.

47.48. Honors Group Tutorial—Oral and written reports under tutorial direction, upon a planned sequence of books representative of the various fields of liberal education. Hr 47.48 fulfills the sophomore humanities requirement for those students interested in the Honors Program. Cr 3.

60. Honors Independent—Cr 1-3.

61. Honors Research Assistantships—Cr 1-3.

62. Honors Independent Research—Cr 1-3.

63. Honors Specialized Seminar—Cr 1-3.

151.152. Honors: Specialized Studies—A tutorially conducted survey of the student's major field, issuing in the choice of an approved thesis topic. Cr 3.

153.154. Honors Thesis—The planning and completion of an honors thesis of research project. Cr 3.

TEACHER EDUCATION PROGRAM

Teacher education is a function and responsibility of the entire University. A universitywide Advisory Council on Education cooperates with the College of Education faculty on the admission of students to a teacher education program. Regardless of a student's college or department affiliation, the student must enroll as a teacher candidate if he desires to receive the University's approval for certification as a public school teacher. Application forms may be obtained at the Student Teaching Office, 105 Shibles Hall.

CERTIFICATES FOR TEACHERS

It should be clearly understood that the State Department of Education has sole authority to issue certificates for teaching. The office of the Dean of the College of Education, however, is in a position to advise prospective teachers concerning certificates.

To provide for the many types of school positions, the State Department issues several types of certificates. However, upon successful completion of his program, the undergraduate student in the College of Education will generally be eligible for the provisional teachng certificates at either the elementary or secondary school level, whichever is applicable. The graduation requirements of the College of Education are established so that all students graduated from the college will meet or exceed the requirements for the provisional certificate.

In addition to furnishing courses for its own students, the College of Education acts as a service agency to provide professional training for students from other teaching units of the University who wish to qualify for a teaching certificate. Such students are enrolled in the same classes with students from the College of Education.

Pattern A

For students in colleges *other than the College of Education preparing for a secondary certificate* (1) a minimum of 30 semester credit hours in a subject field normally taught in secondary schools (which may include three hours of special methods) together with (2) a minimum of 18 semester credit hours in a second subject field is required unless pattern B is followed.

Pattern B

A minimum of 50 semester credit hours including three hours of special methods within the area of specialization (i.e., social studies, English, science and mathematics, the sciences).

Requirements for certificates in the areas of physical education, and art education differ from the above. Information may be obtained at the office of the College of Education.

Acceptable 30-Hour Majors

Acceptable 30-hour majors are: English, French, Russian, speech, German, economics, Latin, Spanish, geology, history, mathematics, chemistry, geography, physics, political science, biology, government, earth science, and sociology.

The following majors are acceptable if approved by the college: health, physical education, home economics, agriculture, industrial arts, art, and music.

Acceptable 18-hour minors, in addition to those listed above, are: psychology, classic studies, science, and social studies.

PLACEMENT FOR TEACHERS

The University of Maine Career Planning and Placement Bureau includes among its services assistance to prospective teachers in finding teaching positions and in facilitating promotion of teachers in service. Information regarding this service may be obtained from the University of Maine, Career Planning and Placement Bureau, Wingate Hall, University of Maine 04469.

COURSES OF INSTRUCTION

Professors Bishop, Butzow, Chiappone, Cobb, Davis, Demont, Drummond, Freeman, Lindlof, Lowell, Roberts, Ryan, Sanford, Supple, Work, Yvon; Associate Professors E. Caffarella, Clemson, Duplisea, Evans, Gray, Harris, Johnson, W. Mehnert, Nichols, Pechinski, Rog, Salesi, Vrooman, Worcester; Assistant Professors A. Abbott, W. Abbott, Andrews, Barrow, R. Caffarella, I. Mehnert, Pelletier, Perry, Pooler, Schutz, Thompson; Instructors Reif, Zeph; Lecturers Coates, Doughty, Godomsky, Toner; Cooperating Associate Pro-

fessors Aceto, Schumacher; Cooperating Assistant Professors Folsom, Rideout, Stankiewicz, Stokes; Cooperating faculty members McIntire, MacKnight, Nesbit, Whitman

Courses numbered 1 to 99 are undergraduate courses. They are open to graduate students but credit earned in these courses may not be used to satisfy advanced degree requirements. Courses numbered 100 to 199 are upperclass graduate courses which may be used for graduate degree credit by graduate students if given prior approval by the graduate student's advisory committee. Courses numbered 200 to 299 are graduate courses which may be elected by undergraduate honor students, or those undergraduates whose advancement in the field will permit their taking a graduate level course among graduate students without disadvantage to themselves. Courses numbered 300 to 399 are graduate level courses which may be taken only by students admitted to the Graduate School.

The following courses may be offered during the regular academic year, through the Continuing Education Division, or the Summer Session.

Appraisal—Pupil Adjustment and Personnel Practices (Ed A)

20. Freshman Early Experience Program—Required of all first-year students in the College of Education. Career-life planning seminar and parallel laboratory (field) experiences in locations off campus. All arrangements, including transportation to laboratory sites, are the responsibility of the College of Education. Cr 4.

21. Human Dynamics in Education—Required of all first-year students in the College of Education, either prior to or subsequent to the Freshman Early Experience Program. Dynamics of human interaction in the classroom, pupil growth patterns, learning theory, cognitive development, and similar topics. All arrangements, including transportation to the laboratory sites, are the responsibility of the College of Education. Cr 3.

100. A Survey of Exceptionality—Provides students with basic knowledge about characteristics, causes and treatments of various handicapping conditions. A basic exposure to the legal framework, organization of special education services and community resources provided through guest speakers and visitations. Prerequisite(s): field experience in special education (may be taken simultaneously). Cr 3.

130. Assessing the Learning and Behavior of Exceptional Children—A skills course in which students will have the opportunity to gain knowledge and competencies related to informal assessment of children's academic performance, development, and social behavior. Prerequisite(s): field experience in special education, Ed A 100, Ed H 115. Cr 3.

150. Guidance and the Teacher—Role of the classroom teacher in studying individual pupils and utilizing accumulative records; resources available to the teachers for help in studying individual pupils; teacher's function in homeroom activities. For elementary or secondary school classroom teachers. Particularly designed for certified classroom teacher. (Offered in regular or modular form.) Cr 3.

160. Characteristics and Identification of the Gifted and Talented—Offers students an opportunity to explore the history, characteristics and identification procedures of gifted and talented education. The national perspective and leading state identification models will be studied with special attention directed toward meeting the educational needs of the gifted and talented living in rural communities. Prerequisite: Ed B 3. Cr 3.

Basic Professional Courses (Ed B)

2. The American School—Examines the nature, role, purposes, and curriculum of elementary and secondary schools with special attention to the place and function of the teacher within this social institution. This is one of the courses prerequisite to student teaching in all regular undergraduate programs. Not open to freshmen. Cr 3.

3. Growth-Learning Process—The pupil and his learning processes, including learning theories, pupil growth patterns, and selected techniques for the study of pupil development. This is one of the courses prerequisite to student teaching in all regular undergraduate programs. Not open to freshmen. Cr 3.

4. The Teaching Process—The procedures of instructional planning, including such items as improved use of small groups, classroom space, and appropriate teaching materials;

measurements, evaluation, and reporting of pupil learning. This is one of the courses prerequisite to student teaching in all regular undergraduate programs. Not open to freshmen. Cr 3.

Curriculum and Instructional Materials (Ed C)

113. Principles of Curriculum Construction (Conservation) for Elementary School Teachers—Open to all elementary teachers who have completed a Conservation Education Workshop or its equivalent. Production of instructional materials on natural resource conservation for schools. Opportunities for writing reference and reading materials for children, units of study, instructional guides, bibliographies, and for making many types of visual aids useful in teaching conservation at the various school levels. Cr 3.

117. Children's Literature—An overview of literature written for children between the ages of four and twelve. Emphasis will be placed on developing means of evaluating various types of books and selecting for individual children. Prerequisite: Ed M 13 and junior standing. (May be taken concurrently with Ed M 13.) Cr 3.

120. Principles of Team Teaching—The Theory and practice of instructional teams. Emphasis on cooperative planning, pupil groupings, and curriculum innovations. Prerequisite: Ed B 2, Ed B 3, Ed B 4 or their equivalents. Cr 3.

123. Principles of Curriculum Construction (Conservation) for Secondary School Teachers—Open to all secondary teachers who have completed a Conservation Education Workshop or its equivalent. Production of instructional materials on natural resource conservation for schools. Opportunities for writing reference and reading materials for children, units of study, instructional guides, bibliographies, and for making many types of visual aids useful in teaching conservation at the various school levels. Cr 3.

132. Student Activities in Secondary Schools—The place, organization and direction of student activities in the modern secondary school. Prerequisite: Ed B 2, Ed B 3, Ed B 4 or their equivalents. Cr 3.

133. Instructional Media—Basic course in the improvement of learning and teaching through the effective use of instructional media and related materials. Learning principles in relation to visual communication media; nature and applications of media and instructional materials; evaluation and selection of media and instructional materials. Cr 3.

134. Teacher-Made Instructional Material—Planning and producing inexpensive instructional materials for both elementary and secondary school subjects; involving either photographic or graphic media. Cr 3.

140. Studies in the Physical Sciences I—An interdisciplinary study of the physical sciences intended to build science attitudes and knowledge of physical science at pre-service and in-service stages for elementary and junior high school teachers. Laboratory-centered investigations in such areas as light, structure of crystals, liquids and gases, motion and forces, and energy. Cr 3.

141. Studies in the Physical Sciences II—The course is laboratory-centered and includes investigations in such areas as bonding in crystals, electric charges, atomic models, ions, molecules, non-ionic substances. Prerequisite: Ed C 140 and permission of instructor. Cr 3.

142. Studies in the Earth Sciences (Elementary)—For elementary school teachers. A series of elementary laboratory and field studies in astronomy and meteorology. Topics selected will be those that can be explored through direct observation and study. Discussions, films, and library assignments. Cr 3.

143. Field Course in the Earth Sciences (Secondary)—For elementary and secondary school teachers who need some introductory information in the earth sciences of geology and soils. Where possible, the studies will be undertaken in a natural setting using equipment and materials appropriate to the learning tasks. Lectures, films and library assignments. Cr 3.

144. Basic Field Ecology—For secondary school science teachers with a broad background in the natural sciences and for qualified elementary school teachers who desire studies beyond introductory natural history courses. Accumulating, interpreting and applying data acquired primarily from the natural environment. Facilities at the Bryant Pond Campus and surrounding areas make possible biotic studies of lower inland elevations to subalpine environments. Intended to serve the needs of teachers conducting studies in the Green Version of BSCS biology. Cr 3.

146. Natural Science Education-Coastal-(Elementary)—Primarily for elementary school teachers. Field studies of plants, animals, rocks, minerals, stars and weather, with special attention to marine life of the Maine coast. Study areas selected with the needs of teacher in mind. Lectures and library work. Offered only in Summer Session, at Goose Cove, Maine. Cr 3.

147. Natural Science Education-Coastal-(Secondary)—Primarily for secondary school teachers. See general description under Ed C 146. Cr 3.

148. Natural Science Education-Inland-(Elementary)—Lectures, library work and field studies in the natural history of inland Maine. Attention to the Bryant Pond area. General ecology, geology, weather and climate studied. Opportunity to study habitats of Maine. For elementary school teacher. Given only in Summer Session at the Freeman-Waterhouse Campus, Bryant Pond, Maine. Cr 3.

149. Natural Science Education-Inland-(Secondary)—Primarily for general science and biology teachers in the secondary school. See general description under Ed C 148. Cr 3.

153. Career Education: The Elementary School—Orienting pre- and in-service teachers to Career Education. A general overview, a conceptual model and a rationale for career development through curriculum practices. Classroom application of the career education concept and techniques for infusing career awareness within traditional academic material. Concepts and content of career education presented as a guide for infusing career education within the school. Prerequisites: Ed B 2, Ed B 3, Ed B 4, or permission of instructor. Cr 3.

154. Career Education: The Secondary School—For pre- and in-service secondary teachers. The major forces currently shaping career education programs, the theories on which the programs are based, and the research on these programs. Strategies for implementing career education courses into curricula as well as the infusion of career education concepts into existing curricula. Prerequisites: Ed B 2, Ed B 3, Ed B 4, or permission of instructor. Cr 3.

165. Educational Programming for Exceptional Children—Examines educational, social and vocational planning for the handicapped in both school and the community. Educational curriculum, curriculum development, legal requirements, funding sources and the organization of state and private agencies. Prerequisite(s): Field experience in special education, Ed H 115, Ed A 100, Ed A 130. Cr 3.

History and Philosophy (Ed H)

2. History of Education—A study of educational thought in its historical bearings with particular emphasis on current modes of thought relative to the values, objectives, purposes, and outcomes of American education. Not open to freshmen. Cr 3.

45. Education Sociology—Major principles of sociology applied to the institution of education; the culture concept and its use in perceiving and understanding the diversity of the social system in relationship to the school and education; school-community interaction, social groups and patterns of social behavior. Cr 3.

100. Trends in Adult Education—Need for and purpose of adult education programs. Consideration of learning, program development, organization, and administration of programs. Emphasis on adult education through the public schools. Cooperative Extension Service, and community agencies. Cr 3.

110. Foundations of Community Education—Traces the development of community education, as a definitive practice, from its beginnings in the mid-1930's to the present. Particular attention given to community education's relationship to political, economic, social, and educational concerns prevalent among today's citizens. Cr 3.

115. Foundations of Exceptionality—Provides students with an opportunity to explore the historical antecedents to contemporary legal and moral issues in the education of exceptional children. Course should enable students to discriminate among major theories of causation and treatment and describe current issues of importance to the field. Prerequisite(s): Field experience in special education, Ed A 100. Cr 3.

130. Trends in Education—Discussion of issues in American education as they relate to current and emerging practices in organization curriculum and teaching in the schools. Cr 3.

151. Education for Intercultural Understanding—Forces of international, racial and religious conflict in contemporary community life; ways in which schools teach understanding of an adjustment to such cultural conflicts. Cr 3.

195. Understanding Reading—Knowledge relating to the processes of (1) learning to read and (2) proficient reading are the concerns of this course. Presents theoretical and empirical information about the following topics: communication, structure of language, acquisition of speech, physiology in reading, learning to read, and proficient reading. Prerequisite: sophomore standing. Cr 3.

199. Seminar in the Foundations of Education—A seminar offered by the faculty in which the nature, role, policies and curriculum of elementary and secondary schools are re-examined. Special attention given to the place and function of the teacher within this social institution. Prerequisites: Ed M 190, 191, 194 or concurrent registration. Cr 3.

School Leadership (Ed L)

151. Organization and Administration of Adult Education—The organization, financing, staffing, promotion, and evaluation of programs of adult education. Teaching resources and the role of the adult education administrator emphasized. Prerequisite: senior standing or permission of instructor. Cr 3.

Methods (Ed M)

13. Teaching of Reading in the Elementary School—General background for teaching reading in the elementary school; reading readiness, comprehension, word analysis skills, directed reading lessons, recreational reading and evaluation. An introductory course. Prerequisite: Pv 1; open to juniors and seniors. Cr 3.

18. Teaching Language Arts in the Elementary School—Current methods and materials in teaching handwriting, spelling, oral and written composition; analysis and correction of basic difficulties. Prerequisite: Py 1; open to juniors and seniors. Cr 3.

114. Teaching Arithmetic in the Elementary School—The arithmetic curriculum in the elementary school; methods and the techniques in teaching arithmetic; the arithmetic readiness program; instructional and evaluation material. An introductory course. Prerequisite: Py 1, Ms 7, Cr 3.

115. Teaching Social Studies in the Elementary School—Methods and materials for social studies in the elementary school; ways of relating the work of the social studies class to the understanding of practical problems of the community. Not open to freshmen. Cr 3.

116. Teaching Science in the Elementary School—Materials, methods, devices, and activities appropriate to the program of science in the elementary school. Prerequisite: Py 1, Ed B 4. Cr 3.

120. Teaching Geography in the Elementary School—Materials, methods, devices, activities, and appropriate background information to the program of teaching geography in the school. Not open to freshmen. Cr 3.

130. Education of the Trainable—Family, social, and educational implications of the trainable mentally retarded child with emphasis on the latter. Teaching methodology appropriate to the needs of the trainable child, as well as curriculum, goals, etc., are also included. Prerequisite: Ed B 2, Ed B 3, Ed B 4, or their equivalents. Cr 3.

140. Teaching Reading in the Secondary School—An exploratory course for high school teachers who wish to develop competence in teaching reading. The nature of the reading process, rationales for continuing reading instruction in junior and senior high schools, teaching reading and study skills, improving rates of reading, organization, evaluation. Cr 3.

141. Teaching Social Studies in the Secondary School—Current practices in teaching social studies; selection and use of instructional materials; modern trends in curriculum construction for social studies in the secondary school. Prerequisite: not open to freshmen. Cr 3.

142. Teaching Science in the Secondary School—Methods and materials in teaching of science; development of the science curriculum, and equipment, supplies, and supplementary materials for science teaching in the secondary schools. Prerequisite: Py 1, junior or senior standing. Cr 3.

143. Teaching Geography in the Secondary School—Materials, methods, devices, activities, and appropriate background information to the program of teaching geography in the school. Not open to freshmen. Cr 3.

150. Newer Practices in Reading—Objectives, materials, and procedures for the improvement of the teaching of reading; methods and materials used in evaluating the reading program; comparison of current practices in reading instruction. Prerequisite: Ed M 13 or Ed M 140, or their equivalents. Cr 3.

160. Behavioral Intervention in Educational Settings—Explores various methods of teaching appropriate classroom behaviors. Behavior modification and psycho-social interventions. Students focus on both the behavior of children in classrooms and the environmental factors which affect behavior. Field placement required for course activities. Prerequisite(s): field experience in special education, Ed A 100, Ed H 115, Ed A 130. Cr 3.

165. Methods of Teaching the Superior Child—Methods, materials and techniques for teaching the gifted child. Prerequisite: Ed B 2, B 3, B 4 or their equivalents. Cr 3.

170. Methods of Teaching the Retarded Child—Methods, materials, and techniques in teaching retarded children at the special class level. Cr 3.

172. Education of the Exceptional Child—The characteristics, identifications, educational provisions, adjustment, and guidance of exceptional students. Prerequisite: Ed B 2, Ed B 3, Ed B 4, or their equivalents. Cr 3.

175. Instructional Strategies for Exceptional Children—An examination of various clinical teaching methods appropriate for children with intellectual, behaviorial and/or learning deficiencies. Prerequisite(s): field experience in special education, Ed A 100, Ed H 115, Ed A 130. Cr 3.

180. Teaching in Adult Education—Methods for teaching adults. Critical examination of major problems in teaching and learning in adult education. Factors that affect learning ability, achievement, motivation to learn through the adult life cycle. Prerequisite: senior standing, graduate standing, or permission of the instructor. Cr 3.

INFORMATION REGARDING STUDENT TEACHING

As a prerequisite to student teaching, it is necessary for all prospective student teachers to make application to the Teacher Education Program and to fulfill the necessary requirements of that program.

There is also a field observation requirement for all students not enrolled in or who have not completed EdA 20 or EdA 21. These students must spend five full days in a public school, observing, assisting, and becoming familiar with various aspects of the teaching profession.

Formal application for student teaching should be made by March 1 of the year prior to that in which the student plans to student teach. It is important that these applications are filed on time. Late applicants may not be able to be placed for student teaching.

190. Full-Day Student Teaching (Elementary)—A full-day, off-campus internship program in a selected school for one half semester; a full-day, on-campus program of college courses the other half. Conferences and group discussions. Perequisite: Ed B 2, Ed B 3, Ed B 4 or their equivalents, methods course, and senior standing. Cr 6.

191. Full-Day Student Teaching (Secondary)—A full-day, off-campus internship program in a selected school for one half semester; a full-day on-campus program of college courses the other half of the semester. Conferences and group discussions. Prerequisites: Ed B 2, Ed B 3, Ed B 4, or their equivalents, methods course, and senior standing. Cr 6.

192. Half-Day Student Teaching (Elementary)—A half-day program of observation and student teaching in a selected school in the University area. The same four consecutive periods must be free daily to schedule course. Conferences and group discussions. Prerequisite: Ed B 2, Ed B 3, Ed B 4, or their equivalents, methods course, and senior standing. Cr 6.

193. Half-Day Student Teaching (Secondary)—A half-day program of observation and student teaching in a selected school in the University area. The same four consecutive periods must be free daily to schedule course. Conferences and group discussions. Prerequisites: Ed B 2, Ed B 3, Ed B 4, or equivalents, methods course, and senior standing. Cr 6.

194. Student Teaching K-12 (Music or Art Education)—Observation and student teaching in selected elementary and secondary schools. Conferences and group discussions. Prerequisites: Ed B 2, Ed B 3, Ed B 4, or their equivalents, methods course, and senior standing. Cr 6.

196. Advanced Internship (Elementary)—A full-day, off-campus advanced intership, teaching in a selected school. Seminars and conferences. Prerequisite: Ed M 190 and permission of the Director of Student Teaching. Cr 2-6. Pass/Fail.

197. Advanced Internship (Secondary)—A full-day, off-campus advanced internship, teaching in a selected school. Seminars and conferences. Prerequisite: Ed M 191 and permission of the Director of Student Teaching. Cr 2-6. Pass/Fail.

General (Ed X)

51. Basic Driver Education—A short, basic, intensive course in driver education for teachers has been arranged in cooperation with the American Automobile Association. Designed to aid high schools in establishing plans for a course in driver education. Not for teaching an individual how to drive. Cr 3.

52. Driver and Traffic Safety Education—An intensive course in driver and traffic safety education for teachers who have completed the basic course in driver education, Ed X 51, and have had at least one year's teaching experience in this area. Problems experienced by teachers in teaching driver education and highway safety. Prerequisite: Ed X 51. Cr 3.

53. Driver Education Simulation—Provides driver education teachers with the necessary knowledge and skills to effectually utilize driver education simulation as part of the total driver education program. Cr 3.

54. Basic Motorcycle Driver Education—Trains Maine driver education teachers in motorcycle driver education to prepare them to meet the requirements of the 1973 motorcycle legislation. Includes both classroom and laboratory (on-the-road) activities. Prerequisite: Ed X 51. Cr 3.

110. Workshop for Cooperative School Personnel (Activity)—A workshop on the nature and scope of the activities of the supervisor, resource teacher, team leader, critic teacher, aides with other school personnel. The literature, research, practices and materials relating to effective utilization of cooperating school personnel as indicated. Cr 3.

162. Workshop in Elementary Education (Activity)—A workshop to increase the competence of the elementary school teacher, supervisor, curriculum director, administrator, and other school personnel. The literature, research and materials concerned with a special aspect of elementary education. Cr 3-6.

163. Workshop in Conservation Education—Most of this elementary school teacher workshop program relates to the mineral, soil, water, forest, fish, wildlife, and recreational resources of Maine. Field studies are emphasized. Cr 3.

172. Workshop in Secondary Education (Activity)—A workshop to increase the competence of the director, administrator, and other school personnel. The literature, research and materials concerned with a special aspect of secondary education. Cr 3-6.

173. Workshop in Conservation Education—Same as course 163 except for secondary teachers. Cr 3.

181. Educational Travel (Area)—A summer session study tour to provide an insight into the social, economic, historical, and geographic aspects of the locale visited. Consideration to those areas that have made major contributions to our cultural heritage. Tours currently conducted in U.S., Europe, Maritime Provinces and Quebec. Cr 3-6.

198. Problems in Education—Individual work on a problem of the student's own selection. Primarily for majors in education. Cr Ar.

DIVISION OF ART EDUCATION

A four-year program in art education is offered by the College of Education for students who intend to teach art or to become supervisors of art in the public or private schools. Majors in art education register in the College of Education and follow a curriculum outlined by the Department of Art in conjunction with the College of Education. Specific requirements for the degree may be obtained from the Department of Art, Carnegie Hall or from the College of Education. Upon satisfactory completion of this course of study, the student is certified to teach on both elementary and secondary levels.

DIVISION OF HEALTH, PHYSICAL EDUCATION AND RECREATION

The professional curriculum in physical education prepares qualified students to teach health and physical education, to coach athletic teams and to direct recreational programs. A bachelor of science degree in education is awarded graduates of this program.

Definite evidence of intellectual capacity, positive qualities of character and personality, good health, and competent proficiency in motor skills are the factors determining admission. Applicants who lack any of these qualities which are considered essential for professional success in health, physical education, and recreation will be advised to enter some other field of study. Applicants are urged to present at least one unit in a laboratory science.

COURSES OF INSTRUCTION (HPER)

James E. Rog, Coordinator; Associate Professor Pechinski, Assistant Professor Abbott; Instructor Reif. Cooperating Personnel from Department of Physical Education and Athletics: Professor Westerman; Associate Professors Styrna, Walkup; Assistant Professors Anderson, Carville, Jordan; Lecturers Ames, Ballinger, Bicknell, Biggs, Burger, Campbell, Chappelle, Davis, Fox, Gavett, Switzer, Winkin

22. Personalized Fitness for Health—An in-depth study of the components of fitness as related to a lifelong conditioning and health program. Personalized profile through testing will be developed for each student. Conditioning programs involving strength, flexibility and cardio-respiratory activities will be prescribed for each student to be followed for the entire semester. Cr 2.

32. Golf/Archery/Bowling Skills—Instruction to develop skills and techniques in these leisure activities. Cr 1.

33. Volleyball/Tennis/Badminton—Instruction to develop skills and techniques in these leisure net sports. Cr 1.

34. Relaxation/Soccer(w)/Handball(m)—Covers a variety of ways to relax, geared to all age levels. Learning how to relax and teaching methods for relaxation stressed. Five weeks devoted to soccer skills for women and handball skills for men. Cr 1.

35. Rhythms—The purpose of this course is to develop skills, techniques and an understanding of basic rhythms, particularly as they relate to folk, social, and square dance patterns. Cr 1.

36. Modern Dance Techniques—The purpose of this course is to develop modern dance compositions. Cr 1.

37. Swimming Skills—Teaching and improving the skills in swimming, springboard diving, water polo, and related aquatic skills. Each phase developed carefully and fully, enabling the more capable to learn how to teach these basic skills at each level, including the beginning level. Cr 1.

40. Methods of Teaching and Coaching Track and Field—Designed to develop proficiency in basic track and field skills and knowledge of methods of teaching and/or coaching track and field. Cr 2.

41. Methods of Teaching and Coaching Basketball—Practical instruction in basketball to develop skills, techniques and understandings for people preparing to enter the teaching and coaching professions. Cr 2.

42. Methods of Teaching and Coaching Baseball—Provides the student with the skills, techniques and understandings necessary to teach and/or coach baseball to youngsters representing all ability levels. Cr 2.

43. Methods of Teaching and Coaching Football—Develops proficiency in basic football skills and knowledge of methods of teaching and/or coaching football. Prerequisite: sophomore standing. Cr 2.

44. Methods of Teaching and Coaching Soccer—Practical instruction in soccer to develop skills, techniques, and understandings for those preparing to enter the teaching and/or coaching professions. Prerequisite: sophomore standing. Cr 2.

45. Methods of Teaching and Coaching Wrestling—Develops skills, techniques and understandings for competency in wrestling. Deals with the responsibilities of the prospective wrestling teacher and coach. Prerequisite: sophomore standing. Cr 2.

46. Methods of Teaching and Coaching Field Hockey—Develops or improves skills in tumbling, apparatus, rhythmic gymnastics; conditioning, spotting techniques, and unit planning in elementary and secondary schools.

47. Methods of Teaching and Coaching Softball—Provides the student with comprehensive instructional materials, including the guiding principles for all aspects of the game. Content includes the skills of softball and methods of coaching and teaching. Prerequisite: sophomore standing. Cr 2.

48. Methods of Teaching and Coaching Field Hockey—Identifies for the prospective teacher/coach the basic skills and techniques used in field hockey. Emphasis on teaching and coaching methods. Prerequisite: sophomore standing. Cr 2.

53. Theories of Conditioning—Familiarizes the student with different physical conditioning regimens and what these programs can and cannot accomplish. Investigates specific traits and components of physical fitness and develops competencies to prescribe conditioning programs to meet specific needs. Cr 3.

56. Elementary School Physical Education—Integrates the goals, objectives and concepts of physical education with the curriculum of the elementary school. Emphasis on purposeful, idea-directed movement and the important contribution of physical education to the growth and development of the elementary school child. Cr 3.

Pe 63. Methods of Modern Dance—The purpose of this course is to prepare the student to teach dance in elementary schools. Cr 1.

67. Methods of Coaching and Teaching Swimming and Diving—Stroke analysis, training and conditioning for competitive swimming, springboard diving, basic synchronized swimming and pool management. Cr 2.

73. Prevention and Care of Athletic Injuries—Prevention and care of common injuries associated with the athletic, school or recreational setting. Use of proper personal and field equipment support methods, medical examinations and therapeutic aids. Prerequisite: Zo 8, Cr 3.

78. Health Education—Stress on elements of services, facilities, and instruction at elementary and secondary school levels as they influence habits of positive health. Cr 2.

155. Philosophy and Organization of Physical Education for Elementary Schools—The philosophical bases for physical education programs at the elementary school level. Contrasting emphases in the curriculum are studied as well as the implications found in perceptual-motor development research. Cr 3.

161. Organization and Administration of Physical Education and Athletics—Development and implementation of administrative policies concerning budgeting and accounting, purchasing, intramurals, the interscholastic program, legal liability, planning new facilities, evaluation of students and programs, public relations, care of equipment, adapted programs and health education. Cr 3.

162. Methods-Teaching Physical Education—Methods of teaching physical education to all grade levels and abilities. Teaching models and practical application of models by students stressed. Teaching theories and principles, developing units of instruction, use of media in teaching, and methods of evaluation. Cr 2.

165. Leadership Organization in the Intra-Extramural Programs—Principles and philosophy, administration, organization, and supervision of intra-extramural activities in the physical education program in elementary, junior, and senior high schools. Cr 3.

168. Advanced Prevention and Care of Athletic Injuries—Acquaints teachers and athletic coaches with modern principles and practices in prevention, treatment, rehabilitation, and safety in physical education and athletics. Cr 3.

171. History and Philosophy of Physical Education—Develops an appreciation of the place and function of physical education during the course of civilization. Assists in the formation of a constructive approach to present-day problems in this area. Cr 2.

172. Tests and Measurements in Physical Education—Techniques and devices for evaluation of physical education programs. Selection and administration of traditional physical perfor-

mance tests, construction of teacher-made tests specific to instructional programs in physical education, and the knowledge and understandings basic to interpretations of tests scores. Cr 3.

176. Kinesiology—Introduction to the analysis of movement patterns based on precepts necessary for the application of basic mechanics and kinesiological principles to the teaching of motor skills. Cr 3.

178. Physiology of Exercise—Develops an understanding of the integration and regulation of physiological functions during physical activity. Through investigation of factors affecting human performance, and coordinated adjustments of body functions, students will become more aware of theoretical and practical application of physical activity. Prerequisites: Zo 8, Pe 53, Pe 176. Cr 3.

180. Health, Physical Education, and Recreation Programs in the Elementary School—Study of skills, progressions in rhythms, sports, and gymnastics. Health programs, including curriculum planning, methods of presentation. Organization and administration of elementary school recreation programs. For elementary classroom teachers. Cr 3.

183. Planning the Health Education Curriculum—Assists students in more thoroughly understanding health education in relation to the total school curriculum. Concepts of curriculum development, national considerations, and current research related to curriculum construction. Cr 3.

184. Practicum in Physical Education—Leadership experiences under staff supervision in the service program. Limited opportunities also exist in local public schools. Consult either Dr. Walkup, Mr. Woodbury or Dr. Cobb before registering. Cr 1-3.

198. Problems in Health and/or Physical Education and Recreation—Individual work on a problem in the area of health, physical education or recreation. Cr 1-3. Consult Dr. Cobb before registering.

Parks and Recreation (Re)

50. Camp Leadership—Designed for the training of camp counselors, with emphasis on participation in the varied activities of camping. Cr 2.

69. Foundations of Recreation—Fundamental concepts, principles, and practices in the field of recreation, with emphasis on historical and philosophical backgrounds. Cr 3.

110. Outdoor Preparedness—Prepares students to meet the challenge of wilderness travel and survival. Map and compass work, summer and winter survival, canoe skills and fitness will be offered. Students will be required to test their skills in field work. Lab fee will be charged. Cr 3.

140. Outdoor Education and Recreation Education—Develops and evaluates educational experiences which can be pursued beyond the traditional classroom setting. Emphasis on the utilization of the outdoor environment as a laboratory for learning the cognitive, affective and psychomotor domains. Cr 3.

145. Community Centers and Playgrounds—Aspects of organization, administration, management, facilities, equipment, and activities of building-centered programs and community playgrounds. Cr 3.

148. Field Experience—Supervised experience in conducting recreation programs in camp, community, social agency or institution situations. Enrollment by permission. Cr 3-6.

185. Recreation Leadership—Skills and practical experiences essential to the development and organization of an effective recreation program. Cr 3.

GRADUATE COURSES

Appraisal—Pupil Adjustment and Personnel Practices (Ed A)

221. Evaluation of Instruction—Cr 3.

222. Learning Theories and Applications in Human Services—Cr 3.

223. Introduction to Adult/Continuing Education—Cr 3.

224. Adult Development and Learning—Cr 3.

225. The Teaching/Learning Process With Adults—Cr 3.

236. The Impact of College on Students—Cr 3.

250. Introduction to Community Counseling Services—Cr 3.
251. Introduction to Pupil Personnel Services—Cr 3.
252. Group Work in Human Services—Cr 3.
253. Introduction to Elementary School Guidance—Cr 3.
254. Introduction to Counseling the Young Child—Cr 3.
255. Introduction to Counseling—Cr 3.
256. Established Theories of Counseling—Cr 3.
257. Play Media in Elementary Guidance & Counseling—Cr 3.
258. Recent Development in Counseling Techniques—Cr 3.
259. Career Information in Counseling—Cr 3.
261. Introduction to Student Personnel Services in Higher Education—Cr 3.
268. Reality Therapy as a Counseling Model—Cr 3.
290. Nature and Needs of the Retarded—Cr 3.
292. Identification of Emotionally Disturbed Children—Cr 3.
320. Educational Measurement—Cr 3.
321. Statistical Methods in Education—Cr 3.
323. The Use of Standardized Group Tests & Inventories—Cr 3.
351. Career Development Theory—Cr 3.
352. Group Procedures in Counseling—Cr 3.
353. Occupational and Educational Information—Cr 3.
354. Organization and Administration of Pupil Personnel Services—Cr 3.
355. Advanced Counseling—Cr 3.

Curriculum and Instructional Materials (Ed C)

210. Planning the Curriculum for the Retarded Child—Cr 3.
211. Planning the Elementary School Curriculum—Cr 3.
217. Literature for Children—Cr 3.
218. Literature for Young Adults—Cr 3.
220. Story Telling—Cr 3.
221. Planning the Secondary School Curriculum—Cr 3.
224. Planning the Junior High School Curriculum—Cr 3.
225. Planning the Environmental Curriculum—Cr 3.
233. The Dynamics of the Curriculum—Cr 3.
237. New Media in Education—Cr 3.
312. Principles of Curriculum Construction (Elementary)—Cr 3.
322. Principles of Curriculum Construction (Secondary)—Cr 3.

Seminars, Research and the Thesis (Ed G)

300. Seminar: Education in the United States—Cr 3.
301. Seminar in Reading—Cr 3.
302. Seminar in Arithmetic—Cr 3.
303. Seminar in Social Studies (Elementary)—Cr 3.
304. Seminar in Science (Elementary)—Cr 3.
305. Seminar: Special Education (Exceptional Children)—Cr 3.
306. Seminar in Higher Education in the U.S.—Cr 3.
307. Seminar in Language Arts—Cr 3.
308. Seminar in Student Personnel Problems—Cr 3.

309. Seminar in College Teaching—Cr 3.
310. Advanced Seminar in Student Personnel Work—Cr 3.
315. Seminar in Methods of Teaching—Cr 3.
316. Seminar in Audio-Visual Aids—Cr 3.
321. Seminar in Social Studies (Secondary)—Cr 3.
322. Seminar in Science (Secondary)—Cr 3.
325. Seminar in Environmental Education—Cr 3.
331. Seminar in Elementary School Curriculum—Cr 3.
341. Seminar in Supervision—Cr 3.
342. Seminar in School Administration—Cr 3.
343. Seminar-The Superintendent—Cr 3.
361. Seminar in Counselor Education—Cr 3.
362. Doctoral Seminar in Counseling—Cr 3.
365. Seminar in Self-Actualization—Cr 3.
375. Advanced Seminar in Science Education—Cr 3.
376. Advanced Seminar in Social Studies Education—Cr 3.
390. Counselor Education Internship—Cr 3.
391. Graduate Apprenticeship—Cr 2-6.
393. Educational Internship—Cr 2-6.
394. Advanced Counselor Education Internship—Cr 3.
395. Educational Research—Cr 3.
396. Doctoral Seminar in Education—No credit.
397. Advanced Educational Research I—Cr 6.
398. Advanced Educational Reserach II—Cr 2-6.
399. Graduate Thesis—Cr 6.

History and Philosophy (Ed H)

200. Advanced Educational Sociology—Cr 3.
261. Comparative Education—Cr 3.
265. History of Higher Education in the United States—Cr 3.
362. Philosophy of Education—Cr 3.

School Leadership (Ed L)

210. School Administration and Supervision—Cr 3.
211. Educational Supervision—Cr 3.
215. Organization and Management of the Special Education Resource Program—Cr 3.
220. Coodinating Service in Special Education—Cr 3.
221. The School Administrator and the Pupil Personal Services—Cr 3.
226. Community Processes and Adult Education—Cr 3.
227. Program Development and Evaluation in Adult Education—Cr 3.
228. Management of Adult/Continuing Education Organizations—Cr 3.
230. Public Relations—Cr 3.
231. School Law—Cr 3.
251. Theories of Administration—Cr 3.
311. The Elementary School Principalship—Cr 3.
321. The Secondary School Principalship—Cr 3.
330. School Finance and Business Management—Cr 3.

340. Education Facility Planning—Cr 3.

350. School Personnel Management—Cr 3.

352. The Governance of Education—Cr 3.

360. Educational Surveys of the School System—Cr 3.

Methods (Ed M)

200. Field Observation (Activity)—Cr 1-3.

210. Human Interaction Skills—Cr 3.

215. Newer Practices in Social Studies in the Elementary School—Cr 3.

216. Advanced Studies in Science Education (Elementary)—Cr 3.

225. Methods of Teaching Environmental Education—Cr 3.

230. Advanced Study in Language Arts—Cr 3.

232. Methods of Teaching the Emotionally Disturbed—Cr 3.

233. Learning Disabilities and the Handicapped Child—Cr 3.

234. Learning Disability—Educational Methods—Cr 3.

241. Newer Practices in Social Studies in the Secondary School—Cr 3.

242. Advanced Studies in Science Education (Secondary)—Cr 3.

251. Newer Practices in Arithmetic—Cr 3.

253. Remedial Reading—Cr 3.

269. Clinical Practices in Reading—Cr 6.

271. Observation and Practice in Special Class Education—Cr 1-6.

273. Problems in Teaching the Slow-Learning Child—Cr 3.

280. Educational Institute (Activity)—Cr 3-6.

301. Diagnosis in Reading—Cr 3.

320. Theories of Teaching—Cr 3.

357. Educational Practicum (Activity)—Cr 3.

358. Counselor Education Practicum—Cr 3.

Vocational (Ed V)

250. Systems and Practices in Vocational Education—Cr 3.

275. Business Education Curriculum—Cr 3.

General (Ed X)

200. The Computer in Education—Cr 3.

251. Workshop in Adult Education (Design and Implementation of Simulation)—Cr 3.

286. Workshop in Special Education (Activity)—Cr 3-6.

398. Individual Study in Education (Field of Specialization)—Cr 3-6.

Physical Education (Pe)

270. Interpretation of Health, Physical Education, and Recreation—Cr 3.

272. Planning the Physical Education Curriculum—Cr 3.

273. Motor Performance and Learning—Cr 3.

275. Current Studies in Health, Physical Education, and Recreation—Cr 3.

277. Organization and Administration of Health, Physical Education and Recreation—Cr 3.

279. Current Studies in the Administration of Athletics—Cr 3.

280. Mechanical Analysis of Human Movement—Cr 3.

282. Physical Education for the Exceptional—Cr 3.

283. Administration of Elementary and Secondary School Health Program—Cr 3.

284. Evaluation Procedures in Health, Physical Education, and Recreation—Cr 3.

310. Seminar in Health, Physical Education, and Recreation—Cr 3.

COURSES TO BE OFFERED PERIODICALLY

(All courses are 3 credit hours except as noted by figure in parentheses following course title.)

Curriculum Instructional Materials (Ed C)

113. Principles of Curriculum Construction (Conservation) for Elementary School Teachers.

123. Principles of Curriculum Construction (Conservation) for Secondary School Teachers.

Seminars, Research and the Thesis (Ed G)

365. Seminar in Self-Actualization.

Methods (Ed M)

273. Problems in Teaching the Slow-Learning Child.

Recreation (Re)

274. Organization and Administration of Recreation Programs.

281. Recreation in the American Community.

specificed by the department chairman. The area of honors work will be shown on the student's transcript.

DEPARTMENTS OF INSTRUCTION

Courses numbered 1 to 99 are undergraduate courses. Courses numbered 100 to 199 are upperclass undergraduate courses for students. Courses numbered 200 to 299 are graduate courses which may be elected by undergraduate honor students, or those undergraduates whose advancements in the field will permit their taking a graduate level course among graduate students without disadvantage to themselves. Courses numbered 300 to 399 are graduate level courses which may be taken only by students admitted to the Graduate School.

When a slant is used between the two numbers (e.g., 1/2), the first semester may be taken by itself, but the second cannot be taken unless the first is taken previously; when a period is used (e.g., 1.2), either semester may be taken for credit; when a dash is used (1-2), both semesters must be taken to obtain credit.

AGRICULTURAL ENGINEERING

Professors Smith (Chairman), Klinge, Rhoades, Rowe; Associate Professors Hedstrom, Huff, Riley, Soule; Assistant Professor Christensen

The Agricultural Engineering curriculum combines study in engineering and mathematics, the biological sciences and the physical sciences to provide a unique background for solving engineering problems associated with agriculture.

The basic curriculum is strengthened by elective options which permit students to specialize in one of four areas according to their interests and needs. Areas of specialization are: (1) Machinery and power units for the agricultural and forest industries; (2) Food and fiber processing systems; (3) Agricultural structures; and (4) Soil and water conservation engineering. Electives in engineering and the life sciences aid in providing a broad base of knowledge for engineering practice.

With the rapidly expanding world population, a rising demand for higher standards of living and with limited natural resources, agricultural engineering graduates are in great demand. Employment opportunities are as diverse as the agricultural industry itself. Graduates in Agricultural Engineering may be employed as design engineers by machinery and farmstead systems manufacturers; as sales engineers by machinery, food or chemical companies; as research engineers by industry, government or state experiment stations or in teaching or extension positions by universities. Some practice as consulting engineers. An increasing number of opportunities for foreign service are opening.

The curriculum in Agricultural Engineering is a joint responsibility of the College of Engineering and Science and the College of Life Sciences and Agriculture and is accredited by the Accreditation Board for Engineering and Technology, Inc.

This degree requires satisfactory completion of at least 130 degree hours at an accumulative grade point average of not less than 2.0.

Graduate Work in Agricultural Engineering

The degrees of master of science (Agricultural Engineering) and master of engineering (Agricultural Engineering) are offered with options for specialization in soil and water engineering, farm structures, agricultural power and machinery, and electric power and processing.

Several research assistantships are available each year. Incumbents devote half time to research work on approved projects of the Agricultural Experiment Station.

AGRICULTURAL ENGINEERING CURRICULUM

Freshman Year

FALL SEMESTER		Hours	SPRING SEMESTER		Hours
AE 20	Principles of Mech.	3	AE 55	Materials in AE.	3
Ge 1	Intro. to Design	2	Ge 2	Intro. to Design	2

Ms 26	Anal. Geom. & Cal.	4	Ms 27	Anal. Geom. & Cal.	4
Ps 1	Gen. Physics	4	Ps 2	Gen. Physics	4
Comm/Hum/SS (usually Ec 10)		3	C/H/SS Elective		3
		16			16

Curriculum		Credit Hours	Minimum Degree Hours Required
A. AGRICULTURAL ENGINEERING			30
Ae 20	Prin. of Mechanization	3	
Ae 55	Materials in Ag. Eng.	3	
Ae 80	Senior Seminar	1	
Ae 81	Department Seminar	1	
Ae 82	Intro. to Ag. Eng.	2	
Ae 83	Spec. Prob. in Ag. Eng.	1	
Ae 160	Agr. Machinery	3	
Ae 163	Farm Structures Design	3	
Ae 164	Instr. and Control Systems	3	
Ae 165	Soil & Water Eng.	4	
Ae 167	Agricultural Power	3	
Ae 169	Agr. Processing	3	
B. BASIC ENGINEERING			28
Ge 1	Intro. to Eng. Design	2	
Ge 2	Intro. to Eng. Design	2	
Ge 7	Computer Programming (or Ms 81)	3	
Me 33	Thermodynamics	3	
Me 50	Statics	3	
Me 51	Strength of Materials	3	
Me 52	Dynamics	3	
Me 123	Design I	3	
Ce 50	Hydraulics (or Me 59 Fluid Mechanics)	3	
Ee 22	Network Fundamentals	3	
C. TECHNICAL ELECTIVES (A group of engineering or science courses selected by the student and approved by the adviser)			9
D. BASIC SCIENCES AND MATHEMATICS			32
Ch 11, 12	Chemistry	8	
Ms 26	Analytic Geom. & Cal.	4	
Ms 27	Analytic Geom. & Cal.	4	
Ms 28	Analytic Geom. & Cal.	4	
Ms 59	Differential Equations	4	
Ps 1	General Physics	4	
Ps 2	General Physics	4	
E. AGRICULTURAL AND BIOLOGICAL SCIENCE			10
Bio 1	Basic Biology	4	
S 2	Soils	3	
	Electives	3	
F. COMMUNICATIONS, HUMANITIES AND SOCIAL SCIENCE			21
G. OTHER			0
LSA 1	University Life	0	
	Minimum Degree Hours Required for Graduation		130

Students transferring to the University of Maine under the regional Program from the Universities of Massachusetts, New Hampshire, Rhode Island, or Vermont after the sophomore year should check the bulletins for those institutions for the first two years in Agricultural Engineering.

CHEMICAL ENGINEERING

(Including Pulp and Paper Technology)

Professors Fricke (Chairman), Bobalek, Chase, Genco**, Thompson; Associate Professors Ceckler, Gorham, Hassler, Mummé, Shelden; Assistant Professors Co, Pendse

Chemical engineers are primarily concerned with designing and operating systems to change materials so that they are more useful for mankind, and with designing the system for the greatest possible economy and the least possible harm to the environment. The basic Chemical Engineering curriculum provides the educational breadth and depth necessary to prepare students to perform this important role in society. Chemical engineers are principally prepared for satisfying and challenging careers involving design, operation, and improvement of chemical processes in the chemical and related industries. However, the broad educational background prepares students for careers in other areas; chemical engineers are now active in the areas of improvement of the environment, planning for utilization of resources, food production, health services, and systems analysis. Chemical engineering training provides a unique background for solving problems involving physical and/or chemical changes in materials that arise in these areas.

The curriculum provides a broad background in the fundamentals of science and engineering, affords opportunities for application of these fundamentals to typical chemical engineering problems to illustrate how comprehensive problems are analyzed and solved, requires the student to select a specialized area and develop skills needed to work more effectively in that area, and provides a broad background in the humanities so that the graduate can understand our society and contribute to its development and improvement.

Chemical engineers must have a sound understanding of chemistry; therefore, courses are required in both fundamental and applied chemistry. Since principles of physics and mathematics are used in chemical engineering, courses in these disciplines are required early in the curriculum. Necessary basic knowledge of electricity and mechanics are provided by courses in the appropriate departments. So that the students may gain an early understanding of the significance of their major field, application oriented chemical engineering courses are begun during the freshman year and are continued through four years in logical sequence.

Students are assisted by faculty counselors in developing an elective program in the humanities and social sciences to meet their individual needs within the general college requirements. However, it is required that the humanities program contain at least one 9-hour sequence in a specific subject and that the sequence include at least two upper level courses.

During the latter part of the student's academic training, the student must select a particular area (technical electives option) within which he or she will receive more specialized chemical engineering or related training. The technical electives option requires a minimum of 12 hours, and the faculty counselor will assist each student in selecting an appropriate option and in scheduling of specific courses to meet this requirement. Technical elective option courses must be in either chemical engineering or pulp and paper technology, unless designated otherwise by department policy.

The four-year curriculum outlined herein leads to the basic degree of bachelor of science in chemical engineering which is fully accredited by the Accreditation Board for Engineering and Technology, Inc. Although the curriculum provides excellent preparation for an effective professional career, superior students can elect to take additional courses, and they are encouraged to do so during the latter stages of their academic training.

Division of Pulp and Paper Technology

Manufacture of pulp and paper products from wood and other renewable fiber resources is one of the largest industries in the United States and the world which depends upon chemical engineering for research, design, and management of a wide range of both organic and inorganic chemical processes in complex and integrated systems.

The Department of Chemical Engineering at the University of Maine at Orono pioneered the first paper studies in the United States, and continues to teach multidisciplinary application of engineering sciences to the varied and complex operations of this forest resources industry. The modern and rapidly expanding paper industry of this state provides an exceptional opportuni-

**Calder Professor of Pulp and Paper Engineering and Science

ty for cooperative interaction of University-based programs with real life problems of industrial development.

Students with a special interest in this industry, whose commitment to the full curriculum for the B.S. degree in chemical engineering is subordinate to other goals, can elect a four-year educational program leading to the degree of bachelor of science in pulp and paper technology. This curriculum is process engineering oriented, but specialized courses designed for work specifically in this industry are substituted for a number of science and engineering courses that are required in chemical engineering. The B.S. in Pulp and Paper Technology meets the minimum requirements of the Engineers' Council for Professional Development, but is not presently accredited as a professional degree as is the B.S. in Chemical Engineering.

Advanced Study in Pulp and Paper Management

Students with a B.S. degree in any of several scientific or engineering disciplines can program a fifth year extension of their undergraduate curriculum to fulfill requirements for a *Certificate of Advanced Study in Pulp and Paper Management*. One half of the fifth year covers basic fiber science and the engineering technology of pulp and paper production. The other half can be an elective sequence to develop special interests in systems engineering, environmental engineering, applied computer sciences, polymer science, process control, plant design, operations economy, engineering management, and others.

Students at the University of Maine who are enrolled in basic curricula for a B.S. degree in engineering or science can include the fifth-year option. The option can be either an extension of a completed four-year program, or an integrated program where the requirements of the fourth year of their basic curriculum and the additional courses of the five-year option are distributed to reinforce each other over the last two years of a five-year program. Where the integrated option is selected, the B.S. degree and the certification are awarded concurrently at the end of the fifth year.

Requirements for a Certificate of Advanced Study in Pulp and Paper Management include the successful completion of a minimum of 30 credit hours beyond the B.S. degree requirements. These hours must include the courses: Pa 165, Pa 166, Pa 173, Pa 174, Pa 295 and Pa 296. Pa 199 may be substituted for Pa 173 or Pa 174, but not for both. The remaining credits are to be taken in courses that constitute a minor field and are usually taken from the College of Business Administration, College of Engineering and Science, and School of Forest Resources, and are selected to enhance the career preparation of the student. A variety of elective course programs can be developed to meet individual needs of the student in consultation and with approval of the faculty advisers involved so that requirements for a Certificate of Advanced Study in Pulp and Paper Management can be completed within one academic year beyond the B.S. degree.

The Certificate Program may be taken concurrently with some M.S. programs after receiving the B.S. degree, with consent of the academic agencies involved. It should be recognized, however, that the Certificate Program is a fifth-year extension of studies at the undergraduate level in those courses which are required, and courses taken in this fifth year will not apply as degree requirements for the M.S. program involved, unless prior permission by the students' graduate advisory committee has been obtained.

Program details will vary for each special case, and can be arranged by conferring with appropriate designated advisers in the Department of Chemical Engineering.

Cooperative "Work-Study" Program Option in Chemical Engineering

Students with satisfactory academic standing at the conclusion of their fourth semester in the B.S. curriculum of Chemical Engineering or Pulp and Paper Technology may petition for and accept opportunities provided by cooperating industries to undertake the special "Co-op" program option. This involves work-study as a chemical engineering intern, with college credit allowed, for two periods of supervised and paid professional experience which alternate with two regular terms of study, over a continuous 15-month period normally beginning in June of the sophomore year and ending in September immediately before the fall semester of the senior year. While college credit is allowed for this program, the credits cannot be used as substitutes for courses required in the minimum curriculum for the B.S. degree. These credits are in addition to the minimum required for the B.S. degree. Students in the "Co-op" program can complete their study program to graduate with a B.S. degree at the same time as do other members of their class who do not elect the "Co-op" option. Consult with the chairman or faculty advisers of the Department of Chemical Engineering for additional details, including procedure for application.

The "Co-op" program positions are awarded on a competitive basis, with common consent of the faculty, the selected student, and the industrial "Co-op" sponsor. Students who successfully complete the requirements of the "Co-op" program are awarded a Certificate of Chemical Engineering Internship together with their B.S. degree.

Graduate Work in Chemical Engineering

A degree of bachelor of science in chemical engineering, or completion of a program consistent with that degree, is required of candidates for a degree of master of science in chemical engineering or master of chemical engineering. Credit for the advanced degree requires a minimum of 30 hours of graduate level courses. A minimum of six hours of thesis is required in the M.S. ChE program, none in the MChE program. Fellowships and assistantships are available to graduate students.

Graduate work leading to the master's degree is also offered in the Pulp and Paper Division interdisciplinary. Candidates who complete, concurrently, in a five-year program, requirements for both the B.S. degree and certificate in pulp and paper may receive graduate credit for 20 hours of suitable courses taken in the fifth year, provided that they have been admitted tentatively to Graduate School before beginning their fifth year. Admission to Graduate School is required only of those students in the Certificate Program who wish to obtain graduate program degree hour credit for a part of the study which overlaps requirements for the certificate, and which is not included as a requirement for the B.S. degree.

Graduate programs are also available that lead to the doctor of philosophy degree in chemical engineering. Details for the requirements for the degree of master of science in chemical engineering, master of chemical engineering, and doctor of philosophy in chemical engineering are given in the Bulletin of the Graduate School of the University of Maine at Orono, and can be obtained from the Graduate School or the Department of Chemical Engineering.

Curriculum for the Basic Professional Degree of B.S. in Chemical Engineering

	FALL SEMESTER	Hours		SPRING SEMESTER	Hours
	First Year				
Ms 26	Anal. Geom. & Calc.	4	Ms 27	Anal. Geom. & Calc.	4
Ch 13	Chem. Principles	4	Ch 14	Chem. Principles	4
ChE 11/12	Intro. to Chem. Eng.	2	ChE 11/12	Intro. to Chem. Eng.	2
Ps 1	Gen. Physics	4	Ps 2	Gen. Physics	4
	*Elect., Hum. or Soc. Sci.	3		*Elect., Hum. or Soc. Sci.	3
		17			17
	Second Year				
Ms 28	Anl. Geom. & Calc.	4	Ms 59	Diff. Equations	4
Ch 151	Organic Chemistry	3	Ch 152	Organic Chemistry	3
Ch 161	Organic Chem. Lab.	2	Ee 22	Network Fund.	3
ChE 101	Fund. of Chem. Eng.	3	ChE 102	Fund. of Chem. Eng.	3
	Elect., Hum. or Soc. Sci.	3		Elect., Hum. or Soc. Sci.	3
		15			16
	Third Year				
Ch 169	Physical Chemistry	4	Ch 170	Physical Chemistry	4
ChE 160	Elem. of Chem. Eng.	4	ChE 162	Elem. of Chem. Eng.	4
ChE 196	Process Control	3	ChE 161	Chem. Eng. Lab. 1	2
	Elect., Hum. or Soc. Sci.	3	ChE 168	Chem. Eng. Kinetics	3
				**Elect., Technical	3
		14			16
	Fourth Year				
Me 55	Sta. & Str. of Mater	3	ChE 178	Process Design	3
ChE 132	Des. of Eng. Mater.	3	ChE 179	Proc. Design Projects	3
ChE 163	Chem. Eng. Lab. II	2	ChE 198	Chem. Eng. Seminar	1
ChE 195	Chem. Eng. Thermo.	3		**Elect., Technical	3

	**Elect., Technical	3		**Elect., Technical	3
	Elect., Hum. or Soc. Sci.	3		Elect., Hum. or Soc. Sci.	3
		17			16

TOTAL DEGREE HOURS = 128
*One must be Eh 1 or equivalent
**Technical elective option programs: courses to be either chemical engineering or pulp and paper technology, unless designated otherwise by department policy for the particular option selected by the student.

Curriculum Requirements for B.S. in Pulp and Paper Technology

First Year

	FALL SEMESTER			SPRING SEMESTER	
Ms 26	Anal. Geom. & Calc.	4	Ms 27	Anal. Geom. & Calc.	4
Ch 13	Chem. Principles	4	Ch 14	Chem. Principles	4
ChE 11/12	Intro. to Chem. Eng.	2	ChE 11/12	Intro. to Chem. Eng.	2
Ps 1	Gen. Physics	4	Ps 2	Gen. Physics	4
	Communications Elect.	3		Elec., Hum. or Soc. Sci.	3
		17			17

Second Year

Ms 28	Anal. Geom. & Calc.	4	Ms 19	Princ. of Statis. Infer.	3
ChE 101	Fund. of Chem. Eng.	3	ChE 102	Fund. of Chem. Eng.	3
Bt 2	Plant Kingdom	4	Ee22	Network Fund.	3
Bc 21	Organic Chemistry*	3	Ch 140	Quant. Analysis	4
Bc 21L	Organic Chemistry Lab.	1	Ch 140L	Quant. Analysis Lab.	0
				Elec., Hum. or Soc. Sci.	3
		15			16

Third year

ChE 160	Elem. of Chem. Eng.	4	ChE 162	Elem. of Chem. Eng.	4
Ch 169	Physical Chemistry	4	Pa 166	Paper Technology	3
Pa 165	Pulp Technology	3		Elec. Hum. or Soc. Sci.	3
Fy 112	Wood Technology I (no lab)	2		Free Elective**	3
	Elec., Hum. or Soc. Sci.	3		Free Elective**	3
		16			16

Fourth Year

ChE 195 or	Chem. Eng. Thermo				
Me 33	Thermodynamics	3	ChE 178	Process Design	3
Pa 173	Pulp Mfg. & Testing	4	Pa 174	Paper Mfg. & Testing	4
ChE 132	Des. of Eng. Materials	3		Free Elective**	3
Me 55	Stat. & Str. of Mater.	3		Free Elective**	3
	Elec., Hum. or Soc. Sci.	3		Elec., Hum. or Soc. Sci.	3
		16			16

TOTAL DEGREE HOURS = 129
*Ch 151 and Ch 161 may be substituted for Bc 21 and 21L.
**All free electives must be approved by the student's adviser and be in areas which enhance the educational goals of the student.

Courses in Chemical Engineering (ChE)

(In each laboratory course a breakage card is required)

11/12. Introduction to Chemical Engineering—Laboratory studies that introduce students to the professional practice of chemical engineering. Small groups will undertake projects that illustrate how sciences are applied to analysis, synthesis, and control of a variety of chemical

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College of Engineering and Science

James L. Clapp, Dean

The College of Engineering and Science offers the following study opportunities:

I. Two-year associate of science degree programs, administered by the School of Engineering Technology:
   Civil Engineering Technology
   Electrical Engineering Technology
   Mechanical Engineering Technology

II. Four-year bachelor of engineering technology degree programs, administered by the School of Engineering Technology:
   Electrical Engineering Technology
   Mechanical Engineering Technology

III. Four-year bachelor of science degree programs:
   Agricultural Engineering (jointly with the College of Life Sciences and Agriculture)
   Chemical Engineering
   Chemistry
   Civil Engineering
   Electrical Engineering
   Engineering Physics
   Forest Engineering (jointly with the College of Life Sciences and Agriculture)
   Mechanical Engineering
   Pulp and Paper Technology
   Surveying Engineering

GRADUATION REQUIREMENTS

I. In all programs:
   (a) An accumulative average not less than 2.0
   (b) Passing grades in all required courses.
   (c) Additional requirements listed under each program description.

II. In the four-year bachelor of science degree programs:
   At least 18 credit hours in the humanities and social sciences are required. The humanities and social sciences are listed in the catalog under Anthropology, Art, Business, Economics, English, Foreign Languages and Classics, History, Music, Philosophy, Modern Society, Political Science, Psychology, Sociology, and courses of a cultural and non-technical nature offered in the School of Performing Arts. No more than three credits in theatre and three credits in applied music may be applied toward this requirement. Elementary languages, English Composition, Scientific German, and courses treating accounting, finance, industrial management, personnel administration, and statistics do not fulfill this requirement. Each department maintains a list of acceptable social science and humanities courses.

Cooperative Work-Study Opportunities

A number of cooperative work-study programs are available in the College of Engineering and Science. Details of each program may be obtained from the appropriate department.

Honors Program

Honors courses listed under Arts and Sciences are available to students in the College of Engineering and Science. The University Honors Program is described elsewhere (see Index). The successful completion of Hr 41 or Hr 45 will exempt a student from Eh 1, Hr 41, Hr 45 (if not used to replace Eh 1), Hr 47, and Hr 48 may be applied to the non-technical elective requirement. Subsequent honors work will replace portions of the standard curriculum as

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II. Four-year bachelor of engineering technology degree programs, administered by the School of Engineering Technology:
   Electrical Engineering Technology
   Mechanical Engineering Technology

III. Four-year bachelor of science degree programs:
   Agricultural Engineering (jointly with the College of Life Sciences and Agriculture)
   Chemical Engineering
   Chemistry
   Civil Engineering
   Electrical Engineering
   Engineering Physics
   Forest Engineering (jointly with the College of Life Sciences and Agriculture)
   Mechanical Engineering
   Pulp and Paper Technology
   Surveying Engineering

GRADUATION REQUIREMENTS

I. In all programs:
   (a) An accumulative average not less than 2.0
   (b) Passing grades in all required courses.
   (c) Additional requirements listed under each program description.

II. In the four-year bachelor of science degree programs:
   At least 18 credit hours in the humanities and social sciences are required. The humanities and social sciences are listed in the catalog under Anthropology, Art, Business, Economics, English, Foreign Languages and Classics, History, Music, Philosophy, Modern Society, Political Science, Psychology, Sociology, and courses of a cultural and non-technical nature offered in the School of Performing Arts. No more than three credits in theatre and three credits in applied music may be applied toward this requirement. Elementary languages, English Composition, Scientific German, and courses treating accounting, finance, industrial management, personnel administration, and statistics do not fulfill this requirement. Each department maintains a list of acceptable social science and humanities courses.

Cooperative Work-Study Opportunities

A number of cooperative work-study programs are available in the College of Engineering and Science. Details of each program may be obtained from the appropriate department.

Honors Program

Honors courses listed under Arts and Sciences are available to students in the College of Engineering and Science. The University Honors Program is described elsewhere (see Index). The successful completion of Hr 41 or Hr 45 will exempt a student from Eh 1, Hr 41, Hr 45 (if not used to replace Eh 1), Hr 47, and Hr 48 may be applied to the non-technical elective requirement. Subsequent honors work will replace portions of the standard curriculum as

specificed by the department chairman. The area of honors work will be shown on the student's transcript.

DEPARTMENTS OF INSTRUCTION

Courses numbered 1 to 99 are undergraduate courses. Courses numbered 100 to 199 are upperclass undergraduate courses for students. Courses numbered 200 to 299 are graduate courses which may be elected by undergraduate honor students, or those undergraduates whose advancements in the field will permit their taking a graduate level course among graduate students without disadvantage to themselves. Courses numbered 300 to 399 are graduate level courses which may be taken only by students admitted to the Graduate School.

When a slant is used between the two numbers (e.g., 1/2), the first semester may be taken by itself, but the second cannot be taken unless the first is taken previously; when a period is used (e.g., 1.2), either semester may be taken for credit; when a dash is used (1-2), both semesters must be taken to obtain credit.

AGRICULTURAL ENGINEERING

Professors Smith (Chairman), Klinge, Rhoades, Rowe; Associate Professors Hedstrom, Huff, Riley, Soule; Assistant Professor Christensen

The Agricultural Engineering curriculum combines study in engineering and mathematics, the biological sciences and the physical sciences to provide a unique background for solving engineering problems associated with agriculture.

The basic curriculum is strengthened by elective options which permit students to specialize in one of four areas according to their interests and needs. Areas of specialization are: (1) Machinery and power units for the agricultural and forest industries; (2) Food and fiber processing systems; (3) Agricultural structures; and (4) Soil and water conservation engineering. Electives in engineering and the life sciences aid in providing a broad base of knowledge for engineering practice.

With the rapidly expanding world population, a rising demand for higher standards of living and with limited natural resources, agricultural engineering graduates are in great demand. Employment opportunities are as diverse as the agricultural industry itself. Graduates in Agricultural Engineering may be employed as design engineers by machinery and farmstead systems manufacturers; as sales engineers by machinery, food or chemical companies; as research engineers by industry, government or state experiment stations or in teaching or extension positions by universities. Some practice as consulting engineers. An increasing number of opportunities for foreign service are opening.

The curriculum in Agricultural Engineering is a joint responsibility of the College of Engineering and Science and the College of Life Sciences and Agriculture and is accredited by the Accreditation Board for Engineering and Technology, Inc.

This degree requires satisfactory completion of at least 130 degree hours at an accumulative grade point average of not less than 2.0.

Graduate Work in Agricultural Engineering

The degrees of master of science (Agricultural Engineering) and master of engineering (Agricultural Engineering) are offered with options for specialization in soil and water engineering, farm structures, agricultural power and machinery, and electric power and processing.

Several research assistantships are available each year. Incumbents devote half time to research work on approved projects of the Agricultural Experiment Station.

AGRICULTURAL ENGINEERING CURRICULUM

Freshman Year

FALL SEMESTER		Hours	SPRING SEMESTER		Hours
AE 20	Principles of Mech.	3	AE 55	Materials in AE.	3
Ge 1	Intro. to Design	2	Ge 2	Intro. to Design	2

Ms 26	Anal. Geom. & Cal.	4	Ms 27	Anal. Geom. & Cal.	4
Ps 1	Gen. Physics	4	Ps 2	Gen. Physics	4
Comm/Hum/SS (usually Ec 10)		3	C/H/SS Elective		3
		16			16

Curriculum		Credit Hours	Minimum Degree Hours Required
A. AGRICULTURAL ENGINEERING			30
Ae 20	Prin. of Mechanization	3	
Ae 55	Materials in Ag. Eng.	3	
Ae 80	Senior Seminar	1	
Ae 81	Department Seminar	1	
Ae 82	Intro. to Ag. Eng.	2	
Ae 83	Spec. Prob. in Ag. Eng.	1	
Ae 160	Agr. Machinery	3	
Ae 163	Farm Structures Design	3	
Ae 164	Instr. and Control Systems	3	
Ae 165	Soil & Water Eng.	4	
Ae 167	Agricultural Power	3	
Ae 169	Agr. Processing	3	
B. BASIC ENGINEERING			28
Ge 1	Intro. to Eng. Design	2	
Ge 2	Intro. to Eng. Design	2	
Ge 7	Computer Programming (or Ms 81)	3	
Me 33	Thermodynamics	3	
Me 50	Statics	3	
Me 51	Strength of Materials	3	
Me 52	Dynamics	3	
Me 123	Design I	3	
Ce 50	Hydraulics (or Me 59 Fluid Mechanics)	3	
Ee 22	Network Fundamentals	3	
C. TECHNICAL ELECTIVES (A group of engineering or science courses selected by the student and approved by the adviser)			9
D. BASIC SCIENCES AND MATHEMATICS			32
Ch 11, 12	Chemistry	8	
Ms 26	Analytic Geom. & Cal.	4	
Ms 27	Analytic Geom. & Cal.	4	
Ms 28	Analytic Geom. & Cal.	4	
Ms 59	Differential Equations	4	
Ps 1	General Physics	4	
Ps 2	General Physics	4	
E. AGRICULTURAL AND BIOLOGICAL SCIENCE			10
Bio 1	Basic Biology	4	
S 2	Soils	3	
	Electives	3	
F. COMMUNICATIONS, HUMANITIES AND SOCIAL SCIENCE			21
G. OTHER			0
LSA 1	University Life	0	
	Minimum Degree Hours Required for Graduation		130

Students transferring to the University of Maine under the regional Program from the Universities of Massachusetts, New Hampshire, Rhode Island, or Vermont after the sophomore year should check the bulletins for those institutions for the first two years in Agricultural Engineering.

CHEMICAL ENGINEERING

(Including Pulp and Paper Technology)

Professors Fricke (Chairman), Bobalek, Chase, Genco**, Thompson; Associate Professors Ceckler, Gorham, Hassler, Mummé, Shelden; Assistant Professors Co, Pendse

Chemical engineers are primarily concerned with designing and operating systems to change materials so that they are more useful for mankind, and with designing the system for the greatest possible economy and the least possible harm to the environment. The basic Chemical Engineering curriculum provides the educational breadth and depth necessary to prepare students to perform this important role in society. Chemical engineers are principally prepared for satisfying and challenging careers involving design, operation, and improvement of chemical processes in the chemical and related industries. However, the broad educational background prepares students for careers in other areas; chemical engineers are now active in the areas of improvement of the environment, planning for utilization of resources, food production, health services, and systems analysis. Chemical engineering training provides a unique background for solving problems involving physical and/or chemical changes in materials that arise in these areas.

The curriculum provides a broad background in the fundamentals of science and engineering, affords opportunities for application of these fundamentals to typical chemical engineering problems to illustrate how comprehensive problems are analyzed and solved, requires the student to select a specialized area and develop skills needed to work more effectively in that area, and provides a broad background in the humanities so that the graduate can understand our society and contribute to its development and improvement.

Chemical engineers must have a sound understanding of chemistry; therefore, courses are required in both fundamental and applied chemistry. Since principles of physics and mathematics are used in chemical engineering, courses in these disciplines are required early in the curriculum. Necessary basic knowledge of electricity and mechanics are provided by courses in the appropriate departments. So that the students may gain an early understanding of the significance of their major field, application oriented chemical engineering courses are begun during the freshman year and are continued through four years in logical sequence.

Students are assisted by faculty counselors in developing an elective program in the humanities and social sciences to meet their individual needs within the general college requirements. However, it is required that the humanities program contain at least one 9-hour sequence in a specific subject and that the sequence include at least two upper level courses.

During the latter part of the student's academic training, the student must select a particular area (technical electives option) within which he or she will receive more specialized chemical engineering or related training. The technical electives option requires a minimum of 12 hours, and the faculty counselor will assist each student in selecting an appropriate option and in scheduling of specific courses to meet this requirement. Technical elective option courses must be in either chemical engineering or pulp and paper technology, unless designated otherwise by department policy.

The four-year curriculum outlined herein leads to the basic degree of bachelor of science in chemical engineering which is fully accredited by the Accreditation Board for Engineering and Technology, Inc. Although the curriculum provides excellent preparation for an effective professional career, superior students can elect to take additional courses, and they are encouraged to do so during the latter stages of their academic training.

Division of Pulp and Paper Technology

Manufacture of pulp and paper products from wood and other renewable fiber resources is one of the largest industries in the United States and the world which depends upon chemical engineering for research, design, and management of a wide range of both organic and inorganic chemical processes in complex and integrated systems.

The Department of Chemical Engineering at the University of Maine at Orono pioneered the first paper studies in the United States, and continues to teach multidisciplinary application of engineering sciences to the varied and complex operations of this forest resources industry. The modern and rapidly expanding paper industry of this state provides an exceptional opportuni-

**Calder Professor of Pulp and Paper Engineering and Science

ty for cooperative interaction of University-based programs with real life problems of industrial development.

Students with a special interest in this industry, whose commitment to the full curriculum for the B.S. degree in chemical engineering is subordinate to other goals, can elect a four-year educational program leading to the degree of bachelor of science in pulp and paper technology. This curriculum is process engineering oriented, but specialized courses designed for work specifically in this industry are substituted for a number of science and engineering courses that are required in chemical engineering. The B.S. in Pulp and Paper Technology meets the minimum requirements of the Engineers' Council for Professional Development, but is not presently accredited as a professional degree as is the B.S. in Chemical Engineering.

Advanced Study in Pulp and Paper Management

Students with a B.S. degree in any of several scientific or engineering disciplines can program a fifth year extension of their undergraduate curriculum to fulfill requirements for a *Certificate of Advanced Study in Pulp and Paper Management*. One half of the fifth year covers basic fiber science and the engineering technology of pulp and paper production. The other half can be an elective sequence to develop special interests in systems engineering, environmental engineering, applied computer sciences, polymer science, process control, plant design, operations economy, engineering management, and others.

Students at the University of Maine who are enrolled in basic curricula for a B.S. degree in engineering or science can include the fifth-year option. The option can be either an extension of a completed four-year program, or an integrated program where the requirements of the fourth year of their basic curriculum and the additional courses of the five-year option are distributed to reinforce each other over the last two years of a five-year program. Where the integrated option is selected, the B.S. degree and the certification are awarded concurrently at the end of the fifth year.

Requirements for a Certificate of Advanced Study in Pulp and Paper Management include the successful completion of a minimum of 30 credit hours beyond the B.S. degree requirements. These hours must include the courses: Pa 165, Pa 166, Pa 173, Pa 174, Pa 295 and Pa 296. Pa 199 may be substituted for Pa 173 or Pa 174, but not for both. The remaining credits are to be taken in courses that constitute a minor field and are usually taken from the College of Business Administration, College of Engineering and Science, and School of Forest Resources, and are selected to enhance the career preparation of the student. A variety of elective course programs can be developed to meet individual needs of the student in consultation and with approval of the faculty advisers involved so that requirements for a Certificate of Advanced Study in Pulp and Paper Management can be completed within one academic year beyond the B.S. degree.

The Certificate Program may be taken concurrently with some M.S. programs after receiving the B.S. degree, with consent of the academic agencies involved. It should be recognized, however, that the Certificate Program is a fifth-year extension of studies at the undergraduate level in those courses which are required, and courses taken in this fifth year will not apply as degree requirements for the M.S. program involved, unless prior permission by the students' graduate advisory committee has been obtained.

Program details will vary for each special case, and can be arranged by conferring with appropriate designated advisers in the Department of Chemical Engineering.

Cooperative "Work-Study" Program Option in Chemical Engineering

Students with satisfactory academic standing at the conclusion of their fourth semester in the B.S. curriculum of Chemical Engineering or Pulp and Paper Technology may petition for and accept opportunities provided by cooperating industries to undertake the special "Co-op" program option. This involves work-study as a chemical engineering intern, with college credit allowed, for two periods of supervised and paid professional experience which alternate with two regular terms of study, over a continuous 15-month period normally beginning in June of the sophomore year and ending in September immediately before the fall semester of the senior year. While college credit is allowed for this program, the credits cannot be used as substitutes for courses required in the minimum curriculum for the B.S. degree. These credits are in addition to the minimum required for the B.S. degree. Students in the "Co-op" program can complete their study program to graduate with a B.S. degree at the same time as do other members of their class who do not elect the "Co-op" option. Consult with the chairman or faculty advisers of the Department of Chemical Engineering for additional details, including procedure for application.

The "Co-op" program positions are awarded on a competitive basis, with common consent of the faculty, the selected student, and the industrial "Co-op" sponsor. Students who successfully complete the requirements of the "Co-op" program are awarded a Certificate of Chemical Engineering Internship together with their B.S. degree.

Graduate Work in Chemical Engineering

A degree of bachelor of science in chemical engineering, or completion of a program consistent with that degree, is required of candidates for a degree of master of science in chemical engineering or master of chemical engineering. Credit for the advanced degree requires a minimum of 30 hours of graduate level courses. A minimum of six hours of thesis is required in the M.S. ChE program, none in the MChE program. Fellowships and assistantships are available to graduate students.

Graduate work leading to the master's degree is also offered in the Pulp and Paper Division interdisciplinary. Candidates who complete, concurrently, in a five-year program, requirements for both the B.S. degree and certificate in pulp and paper may receive graduate credit for 20 hours of suitable courses taken in the fifth year, provided that they have been admitted tentatively to Graduate School before beginning their fifth year. Admission to Graduate School is required only of those students in the Certificate Program who wish to obtain graduate program degree hour credit for a part of the study which overlaps requirements for the certificate, and which is not included as a requirement for the B.S. degree.

Graduate programs are also available that lead to the doctor of philosophy degree in chemical engineering. Details for the requirements for the degree of master of science in chemical engineering, master of chemical engineering, and doctor of philosophy in chemical engineering are given in the Bulletin of the Graduate School of the University of Maine at Orono, and can be obtained from the Graduate School or the Department of Chemical Engineering.

Curriculum for the Basic Professional Degree of B.S. in Chemical Engineering

	FALL SEMESTER	Hours		SPRING SEMESTER	Hours
	First Year				
Ms 26	Anal. Geom. & Calc.	4	Ms 27	Anal. Geom. & Calc.	4
Ch 13	Chem. Principles	4	Ch 14	Chem. Principles	4
ChE 11/12	Intro. to Chem. Eng.	2	ChE 11/12	Intro. to Chem. Eng.	2
Ps 1	Gen. Physics	4	Ps 2	Gen. Physics	4
	*Elect., Hum. or Soc. Sci.	3		*Elect., Hum. or Soc. Sci.	3
		17			17
	Second Year				
Ms 28	Anl. Geom. & Calc.	4	Ms 59	Diff. Equations	4
Ch 151	Organic Chemistry	3	Ch 152	Organic Chemistry	3
Ch 161	Organic Chem. Lab.	2	Ee 22	Network Fund.	3
ChE 101	Fund. of Chem. Eng.	3	ChE 102	Fund. of Chem. Eng.	3
	Elect., Hum. or Soc. Sci.	3		Elect., Hum. or Soc. Sci.	3
		15			16
	Third Year				
Ch 169	Physical Chemistry	4	Ch 170	Physical Chemistry	4
ChE 160	Elem. of Chem. Eng.	4	ChE 162	Elem. of Chem. Eng.	4
ChE 196	Process Control	3	ChE 161	Chem. Eng. Lab. 1	2
	Elect., Hum. or Soc. Sci.	3	ChE 168	Chem. Eng. Kinetics	3
				**Elect., Technical	3
		14			16
	Fourth Year				
Me 55	Sta. & Str. of Mater	3	ChE 178	Process Design	3
ChE 132	Des. of Eng. Mater.	3	ChE 179	Proc. Design Projects	3
ChE 163	Chem. Eng. Lab. II	2	ChE 198	Chem. Eng. Seminar	1
ChE 195	Chem. Eng. Thermo.	3		**Elect., Technical	3

	**Elect., Technical	3		**Elect., Technical	3
	Elect., Hum. or Soc. Sci.	3		Elect., Hum. or Soc. Sci.	3
		17			16

TOTAL DEGREE HOURS = 128
*One must be Eh 1 or equivalent
**Technical elective option programs: courses to be either chemical engineering or pulp and paper technology, unless designated otherwise by department policy for the particular option selected by the student.

Curriculum Requirements for B.S. in Pulp and Paper Technology

First Year

	FALL SEMESTER			SPRING SEMESTER	
Ms 26	Anal. Geom. & Calc.	4	Ms 27	Anal. Geom. & Calc.	4
Ch 13	Chem. Principles	4	Ch 14	Chem. Principles	4
ChE 11/12	Intro. to Chem. Eng.	2	ChE 11/12	Intro. to Chem. Eng.	2
Ps 1	Gen. Physics	4	Ps 2	Gen. Physics	4
	Communications Elect.	3		Elec., Hum. or Soc. Sci.	3
		17			17

Second Year

Ms 28	Anal. Geom. & Calc.	4	Ms 19	Princ. of Statis. Infer.	3
ChE 101	Fund. of Chem. Eng.	3	ChE 102	Fund. of Chem. Eng.	3
Bt 2	Plant Kingdom	4	Ee22	Network Fund.	3
Bc 21	Organic Chemistry*	3	Ch 140	Quant. Analysis	4
Bc 21L	Organic Chemistry Lab.	1	Ch 140L	Quant. Analysis Lab.	0
				Elec., Hum. or Soc. Sci.	3
		15			16

Third year

ChE 160	Elem. of Chem. Eng.	4	ChE 162	Elem. of Chem. Eng.	4
Ch 169	Physical Chemistry	4	Pa 166	Paper Technology	3
Pa 165	Pulp Technology	3		Elec. Hum. or Soc. Sci.	3
Fy 112	Wood Technology I (no lab)	2		Free Elective**	3
	Elec., Hum. or Soc. Sci.	3		Free Elective**	3
		16			16

Fourth Year

ChE 195	Chem. Eng. Thermo				
or					
Me 33	Thermodynamics	3	ChE 178	Process Design	3
Pa 173	Pulp Mfg. & Testing	4	Pa 174	Paper Mfg. & Testing	4
ChE 132	Des. of Eng. Materials	3		Free Elective**	3
Me 55	Stat. & Str. of Mater.	3		Free Elective**	3
	Elec., Hum. or Soc. Sci.	3		Elec., Hum. or Soc. Sci.	3
		16			16

TOTAL DEGREE HOURS = 129
*Ch 151 and Ch 161 may be substituted for Bc 21 and 21L.
**All free electives must be approved by the student's adviser and be in areas which enhance the educational goals of the student.

Courses in Chemical Engineering (ChE)

(In each laboratory course a breakage card is required)

11/12. Introduction to Chemical Engineering—Laboratory studies that introduce students to the professional practice of chemical engineering. Small groups will undertake projects that illustrate how sciences are applied to analysis, synthesis, and control of a variety of chemical

process systems. ChE 12 is devoted to computer programming in FORTRAN with an introduction to numerical methods. Rec 1, Lab 3, Cr 2.

IDL 33. Introduction to Engineering—Lecture sessions are on computer programming (FORTRAN), pulp and paper processes, and an engineering problem of current topical interest such as energy or ecology. Small group laboratory projects deal with various topics of interest, typically chosen from ecology and environment, pulp and paper processes, analytical instrumentation, energy, materials science, and computer programming and applications. Admission by permission only. Cr 3.

101.102. Fundamentals of Chemical Engineering—The application of the principles of material and energy balances to the solution of problems in chemical engineering operations and processes through quantitative correlation of basic concepts of chemistry, physics, and mathematics. Prerequisite: Ch 14 or permission. Rec 3, Cr 3.

IDL 130. (ChE, Ch) Polymer Chemistry and Reaction Engineering—Synthesis and production of polymeric materials from monomers or by modification of natural polymers. Various types of polymer-forming reactions, their catalysis, and industrial reaction systems used to comprise the major subject areas. Prerequisite: Ch 151, Corequisite: Ch 170, Cr 3.

IDL 131. (ChE, Ch) Polymer Structure and Properties—Structure and properties of polymeric materials, and principles underlying processing of such materials. Polymer structure and morphology, transitional phenomena, polymer crystallinity, rubbery and glassy states, solution behavior, rheology, mechanical properties and the relation to chain structure are considered. Prerequisite: Ch 170 or equivalent. Cr 3.

132. Design of Engineering Materials—Some relationships between structure of matter and functional properties of engineering materials; application of these principles to materials selection or synthesis to serve engineering design. Prerequisite: junior standing in engineering or physical science. Rec 3, Cr 3.

150. Analog Computers and Simulation—Fundamentals of linear and non-linear analog computer programming. Simulation of physical systems via analog computer and block-oriented digital computer methods. Modelling of continuous dynamic processes. Introduction to analog-digital programming logic. Prerequisite: Ms 59 (or concurrent registration) or permission. Lec 2, Lab 2, Cr 3.

151. Digital Computer-Process Control Systems—Features of process control computers stressed. Use of equipment in solving laboratory problems, and applications in engineering and science. Lec 2, Lab 2, Cr 3.

154. Elements and Applications of the Theory of Automatic Control—Introductory survey of the theory of automatic control systems. Operational techniques to support laboratory practice in application of the theory to some specific examples of industrial process control problems. Recommended for students whose major is not in chemical engineering. Prerequisite: Ms 59. Rec 2, Lab 2, Cr 3.

160/162. Elements of Chemical Engineering—Introduction to rate operations, stage operations, and the principles of molecular and turbulent transport of mass, momentum, and energy. Application of these principles to the chemical engineering unit operations. Prerequisite: ChE 102. Rec 4, Cr 4.

161.163. Chemical Engineering Laboratory—Application of the principles of the unit operations and process control in the laboratory, using pilot scale equipment. Emphasis is placed upon formal reports. Corequisites: ChE 160, 162, 196. Lab 4, Cr 2.

168. Chemical Engineering Kinetics—A study of the rates and mechanisms of ordinary and catalyzed reactions with the view of providing the data for process design. Prerequisite: Ch 170. Rec 3, Cr 3.

178. Elements of Chemical Process Design—Special studies of principles and methods in coordination of engineering data and theory to problems in plant design. Majors in chemical engineering should schedule this course concurrently with or before ChE 179. Rec 3, Cr 3.

179. Process Design Projects—A guided independent study with practical application of decision-making techniques to solve comprehensive problems that involve feasibility, analysis, design, optimization and management of chemical processes. Rec 1, Lab 4, Cr 3. Prerequisite: senior standing.

187. Chemical Engineering Practice—A work-study experience of some commercial operations of the chemical process industry. Prerequisite: permission. Cr Ar. May be taken more than once until a total of 8 credit hours is accumulated.

195. Chemical Engineering Thermodynamics—Application of thermodynamics to the analysis of systems of interest to chemical engineers. Topics include the first and second laws of thermodynamics, thermodynamic properties, chemical equilibrium, and an introduction to statistical and irreversible thermodynamics. Prerequisite: ChE 102. Rec 3, Cr 3.

196. Process Control—Process dynamics described by ordinary differential equations and by linearized approximations. Solution of system equations by use of Laplace transforms. Concepts of feedback control and close-loop system analysis. Prerequisite: ChE 102 and Ms 59. Rec 3, Cr 3.

197. Special Topics in Chemical Engineering—Selected subjects in the field of chemical engineering, or related areas of science and technology, not covered in other courses. May be taken more than once. Prerequisite: permission. Cr 3.

198. Chemical Engineering Seminar—Discussion of recent developments in chemical engineering and related fields. Prerequisite: senior chemical engineering standing. Cr 1.

199. Undergraduate Thesis—Original investigation of a chemical engineering problem, and reporting of the results. Cr Ar; accumulative credit hours for 2 or more semesters is 3-6.

Graduate Courses

220. Colloid Technology—Rec 3, Cr 3.

221. Intermediate Chemical Engineering Thermodynamics—Rec 3, Cr 3.

222. Chemical Engineering Plant Design—Rec 3, Cr 3.

223. Economic Balance—Rec 3, Cr 3.

230. Polymer Science—Rec 3, Cr 3.

231. Advanced Chemical Engineering Kinetics—Rec 3, Cr 3.

242. Advanced Process Dynamics and Control—Rec 3, Cr 3.

252.253. Special Problems in Computer Programming and Systems Analysis.

260. Heat Transfer—Rec 3, Cr 3.

262. Mass Transfer—Rec 3, Cr 3.

270. Chemical Engineering of Pulp and Paper Manufacturing—Rec 3, Cr 3.

280. Chemical Engineering Analysis—Rec 3, Cr 3.

287. Chemical Engineering Practice—Time and credit to be arranged.

330. Advanced Chemical Engineering Thermodynamics—Rec 3, Cr 3.

351. Transport Phenomena-Momentum—Rec 3, Cr 3.

352. Transport Phenomena-Mass and Energy—Rec 3, Cr 3.

362. Fluid Dynamics—Rec 3, Cr 3.

363. Topics in Advanced Chemical Engineering Unit Operations—Rec 3, Cr 3.

364. Topics in Advanced Chemical Engineering Technology—Rec 3, Cr 3.

365. Topics in Advanced Chemical Engineering Science—Rec 3, Cr 3.

395. Graduate Seminar—Rec 1, Cr 1.

396. Graduate Seminar—Pre. ChE 295. Rec 1, Cr 1.

399. Graduate Thesis—Cr Ar.

Courses in Pulp and Paper Technology

165. Pulp Technology—The chemical and engineering principles of manufacturing various wood pulps. Prerequisite: Ch 14, Rec 3, Cr 3.

166. Paper Technology—The principles of paper manufacturing from the preparation of fiber furnishes to the final stage of surface coating. Rec 3, Cr 3.

172. Pulp and Paper Equipment—A lecture and recitation course involving the description and production calculations of pulping, stock preparation, stock flow, paper formation, power plant and auxiliary equipment. Prerequisite: 12 credit hours of engineering. Rec 3, Cr 3.

173. Pulp Manufacture and Testing—A problem-oriented laboratory course involving the process design criteria for the production of semi-chemical and chemical wood pulps. Prerequisite: Pa 165 (may be taken concurrently). Lab 8, Cr 4.

174. Paper Manufacture and Testing—A problem-oriented laboratory course involving the process design of paper making and finishing systems. Prerequisite: Pa 166 (may be taken concurrently). Lab 8, Cr 4.

199. Undergraduate Thesis—Original investigation of a pulp and paper problem and reporting of the results. Prerequisite: permission. Cr Ar.

Graduate Courses

273.274. Design Practices in the Pulp and Paper Industry—Cr 3.

284. Decision Techniques in Management of Engineering Projects—Rec 3, Cr 3.

295.296. Graduate Seminar—Rec 1, Cr 1.

399. Graduate Thesis—Cr Ar.

CHEMISTRY

Professors Dunlap (Chairman), Goodfriend, Green, Patterson, Rasaiah, J. Wolfhagen; Associate Professors Bentley, Georgitis, Jensen, Russ, Zollweg*; Assistant Professor Anderegg, Brajter-Toth; Teaching Associate H. Wolfhagen; Visiting Asst. Prof. Toth

The Chemistry curriculum is designed to give the student a thorough understanding of the fundamental nature of material substances, the changes they undergo and the laws governing such changes. It also aims to develop skill in those laboratory techniques required to synthesize and to analyze substances and to study their properties.

Because a knowledge of chemistry is fundamental to successful work in so many fields, the Chemistry curriculum affords an unusual opportunity for a wide choice of electives so that the chemistry major may adapt his program to his individual interest and future needs. The curriculum leading to American Chemical Society certification prepares the student, upon graduation, for employment in the chemical industry in the fields of production and control, development, or research. Maine graduates in chemistry who attain better than average levels of proficiency are exceptionally well qualified for graduate study in chemistry.

The proper choice of electives will enable the student to enter related fields of industrial management, technical sales and service, and teaching, or may qualify him for medical school or graduate work in an interdisciplinary field such as oceanography. Students interested in these fields, or those who have special interests in the biological sciences, chemical engineering, geology, mathematics, or chemical physics should discuss their goals with departmental advisers, who can suggest elective sequences. Up to 18 semester hours of free electives may be taken while remaining within a normal five course per semester load. Better students may elect additional courses. Some variation in the order in which courses are taken is possible.

The chemistry major, in order to qualify for a degree in the College of Engineering and Science, must complete a minimum of 120 degree hours, including all the courses listed in the specimen curriculum except those marked with an asterisk.

Superior students should seriously consider continuing their studies at the graduate level and should plan on meeting only minimum ACS requirements so that they can include in the undergraduate program a second language, advanced mathematics, advanced physics, or additional courses in the life sciences.

For chemistry courses in the Summer Session, see the Summer Session catalog.

For a description of courses in biochemistry, see the list of courses given by the Department of Biochemistry.

*on leave 1980-81

Cooperative Work-Study Program Option in Chemistry

A program is available which allows students to accept opportunities provided by cooperating industries for employment under this option. The student may work during the summer or part of one summer and either the following or immediately preceding semester. Credit will be allowed for this work under course number Ch 100 or Ch 200. This will be a supervised and paid professional experience.

Consult the Department of Chemistry for details.

Five-Year Combined B.S.—M.S. Program

Selected students may apply for this option, which allows completion of both the bachelor of science and the master of science degree in five years. Work completed as part of the Honors Program may be included in the five-year program. Application should be made to the department early in the Junior year.

Consult with the chairperson of the Department of Chemistry for details.

Graduate Work in Chemistry

The Department of Chemistry offers a program of study and research leading to the M.S. and Ph.D. degrees. The general requirements for advanced degrees are described in the general section of the Graduate School Catalog. Specific requirements for admission to advanced study in chemistry and information about the programs of study offered are given in the chemistry section of the catalog.

CURRICULUM IN CHEMISTRY

A. REQUIRED TECHNICAL COURSES.

These are arranged in the recommended sequence. See departmental advisers for variations.

Freshman Year

FALL SEMESTER		Hours	SPRING SEMESTER		Hours
Ch 13			Ch 14		
or			or		
(Ch 11)	Chem. Principles	4	(Ch 12)	Chem. Principles	4
Eh 1	Freshman Comp.	3	†ChE 12	(Fortran Progr.)	2
Ms 26	Anal. Geom. and Cal.	4	Ms 27	Anal. Geom. and Cal.	4
Ps 1	General Physics	4	Ps 2	General Physics	4
		15			14

Sophomore Year

Ch 140	Anal. Chemistry	4	Ch 152	Organic Chem.	3
Ch 151	Organic Chem.	3	Ch 162	Organic Chem. Lab.	2
Ch 161	Organic Chem. Lab.	2	*Ms 59	Diff. Equations	4
Ms 28	Anal. Geom. and Cal.	4	Sc 3	Fund. of Pub. Speaking	3
	Other	3		Other	3-6
		16			15-18

Junior Year

Ch 169	Physical Chem.	4	Ch 170	Physical Chem.	4
Ch 171	Phys. Chem. Lab.	2	Ch 172	Phys. Chem. Lab.	2
*Ch 185	Chem. Literature	2	*Ch 190	Intermed. Organic Chem. Lab.	3
**Gm 1	Elementary German	3 or 4	**Gm 2	Elementary German	3 or 4
	Other	3-6		Other	3
		14-18			15-16

Senior Year

Ch 154	Adv. Inorganic Chem.	3	*Ch 164	Instrumental Anal.	4
**Gm 3	Intermed. German	3	**Gm 7	Scientific German	3
	Other	9-12		Other	8-11
		15-18			15-18

*Required for certification by the American Chemical Society. Certain substitutions may be permitted.
**Not required for certification, but strongly recommended.
†Cs 81 or Ge 7 may be substituted for ChE 12.
We recommend that either of those courses be completed by the end of the second year.

B. ADDITIONAL REQUIREMENTS

At least one year of study of a major foreign language designated by the department. German or Russian is strongly recommended if the student plans to enter graduate school.

A total of 18 hours in social science, humanities, or fine arts, including at least one course in literature. Eh 5 or Eh 6 is recommended.

Courses in Chemistry (Ch)

11/12. General Chemistry—Descriptive chemistry and applications of chemical principles. Less quantitative than Ch 13/14. Some familiarity with elementary physics is helpful as is a course in high school chemistry, though neither is required. This course can serve as a basis for further study in the department. Prerequisite: High school algebra and trigonometry or Ms 4. Rec 3, Lab 3, Cr 4.

13/14. Chemical Principles—Study of a restricted number of topics in sufficient detail to provide the student with a foundation for subsequent work in more advanced courses in science and engineering. Some choice of modules, based on the students' educational goals, is possible in the second semester. Mathematical aptitude for handling quantitative applications is necessary. Rec 3, Lab 3, Cr 4.

100.200. Field Experience/Cooperative Education—Supervised employment with relevance to the study of chemistry in the public or private sector. A proposed program of study, mutually agreed upon by the student, his or her faculty adviser, and "Co-op" sponsor may be carried out in the summertime or during the academic year. A written report is required.A specimen curriculum is available in the department office. Prerequisites: junior or senior standing with a good academic record; permission. Cr 1-9 (pass-fail).

IDL 130. (Same as ChE 130)—Polymer Chemistry and Reaction Engineering—The synthesis and production of polymeric materials from monomers or by modification of natural polymers. Polymer-forming reactions, their catalysis, and industrial reaction systems. Characteristics of chain and step-reaction polymerization, free radical, ionic and coordination complex catalysis, stereo-chemistry, thermochemistry, polymerization techniques. Influence of reactor type and reaction system on products. Relation of theory and practice. Prerequisite: Ch 151 or equivalent and Ch 170 or equivalent. Rec 3, Cr 3.

IDL 131. (Same as ChE 131)—Polymer Structure and Properties—Structure and properties of polymeric materials. Principles underlying the processing of such materials. Polymer structure and morphology, transitional phenomena, polymer crystallinity, the rubbery and glassy states, solution behavior, rheology, mechanical properties and the relation to chain structure. Relation of theory and practice. Prerequisite: Ch 170 or equivalent. Rec 3, Cr 3.

140. Quantitative Analysis—An introductory course illustrating the fundamental principles of gravimetric and volumetric analysis. Prerequisite: Ch 12 or 14, Rec 2, Lab 6, Cr 4.

151/152. Organic Chemistry Lecture—An introduction to the chemistry of carbon compounds. Prerequisite: Ch 12 or 14, Rec 3, Cr 3.

154. Advanced Inorganic Chemistry—Advanced theoretical and descriptive inorganic chemistry emphasizing periodic relationships. Corequisite Ch 169 or equivalent. Rec 3, Cr 3.

155. Advanced Inorganic Chemistry—A systematic study of the preparation and physical and chemical properties of nonorganic materials emphasizing periodic trends. Prerequisite: Ch 154 and Ch 170. Rec 3, Lab 3, Cr 4.

161/162. Organic Chemistry Laboratory—An introduction to the synthesis and study of organic compounds in the laboratory. Prerequisite: credit or concurrent registration in Ch 151/152. Lab 4, Cr 2.

164. Instrumental Analysis—Emphasis on instrumental methods. Prerequisite: Ch 140 and Ch 172. Rec 2, Lab 6, Cr 4.

169/170. Physical Chemistry—Applications of classical and statistical thermodynamics, quantum mechanics and principles of kinetics to chemical and electrochemical systems. Prerequisite: Ch 12 or 14, Ps 2 or 2a, Ms 28 or equivalent. Rec 4, Cr 4.

171.172. Physical Chemistry Laboratory—First semester: properties of gases, thermochemistry and phase equilibria. Second semester: aqueous solution equilibria, including electrochemistry, and kinetics. Development of research techniques and attitudes. Prerequisite: credit or concurrent registration in Ch 169/170; additionally Ch 140 or permission for Ch 172. Lab 4, Cr 2.

185. Chemical Literature—A study of methods for searching the chemical literature. Prerequisite: Ch 152 and elementary German. Rec 2, Cr 2.

190. Intermediate Organic Chemistry Laboratory—Qualitative organic analysis by chemical and instrumental methods. Prerequisite: Ch 152; Ch 162. Rec 1, Lab 4, Cr 3.

IDL 198. Undergraduate Research Participation—A limited number of qualified undergraduates may obtain credit for directed individual research. Course may be repeated. Prerequisite: permission of supervisor. Cr 1 to 3.

199. Undergraduate Thesis—The thesis will embody the result of an original investigation carried out in the library and in the laboratory. Open only to seniors with the consent of the department head. Cr 1-3.

Graduate Courses in Chemistry

213. The Chemistry of Cellulose and Wood Components—Rec 3, Cr 3.

240. Modern Techniques in Chromatography—3 Cr.

251. Topics in Advanced Organic Chemistry—Cr Ar.

256. Theoretical Organic Chemistry—Rec 3, Cr 3.

261. Topics in Advanced Inorganic Chemistry—Cr Ar.

271. Topics in Advanced Physical Chemistry—Cr Ar.

277. Intermediate Physical Chemistry—Rec 3, Cr 3.

278. Intermediate Physical Chemistry—Rec 3, Cr 3.

289. Advanced Organic Chemistry Laboratory—Lab 6, or 8, Cr 3 or 4.

290. Organic Qualitative Analysis—Lab 8, Cr 4.

291. Intermediate Organic Chemistry—Rec 3, Cr 3.

295. Chemical Thermodynamics—Rec 3, Cr 3.

351. Topics in Advanced Organic Chemistry—Cr Ar.

361. Topics in Advanced Inorganic Chemistry—Cr Ar.

371. Topics in Advanced Physical Chemistry—Rec 2, Cr 2.

373. Statistical Thermodynamics—Rec 3, Cr 3.

395. Graduate Seminar—Rec 1, Cr 1.

398. Graduate Research—Cr Ar.

399. Graduate Thesis—Cr Ar.

CIVIL ENGINEERING

Professors Gorrill, Greenwood, Nightingale; Associate Professors Alexander (Chairman), Brutsaert, Epstein*, Keating* (on leave), Pearce, Tyler*; Assistant Professors Leick*, Lowry, Rock, Wardell, Weng*; Cooperating Associate Professor Uttormark; Faculty Associate Woodward

*Surveying Engineering Faculty

Undergraduate Programs

The Civil Engineering Department offers four-year undergraduate programs leading to bachelor of science degrees in both civil engineering and surveying engineering.

The Civil Engineering curriculum provides a broad based program stressing the fundamentals common to the many branches of civil engineering. The curriculum is designed to provide the student with a well founded civil engineering education and yet allow the student the option of selecting electives in one or more branches such as: environmental, geotechnical, structures, transportation, water resources, construction, coastal and ocean engineering.

The program is accredited by the Accreditation Board for Engineering and Technology (formerly the Engineer's Council for Professional Development).

CIVIL ENGINEERING CURRICULUM

Freshman Year

FALL SEMESTER		Hours	SPRING SEMESTER		Hours
Sv 5	Plane Surveying	3	Eh 1	College Comp.	3
Ge 1	Intro. to Eng. Design	2	Ge 2	Intro. to Engr. Design	2
Ms 26	Anal. Geom. & Cal.	4	Ms 27	Calculus	4
Ps 1	General Physics	4	Ps 2	General Physics	4
____	H/SS Elective[1]	3	____	H/SS Elective	3
		16			16

Sophomore Year

Ce 10	Materials	4	Me 51	Str. of Materials	3
Ch 13	Chemistry	4	Ms 59	Diff. Equations	4
Ge 7	Computer Prog.	3	____	Basic Science Elect.[2]	4
Me 50	Statics	3	____	Engr. Sci. Elect.[3]	3
Ms 28	Calculus	4	____	H/SS Elect.	3
		18			17

Junior Year

Ce 25	Transportation Engr.	3	Ce 66	Soil Mechanics Lab	1
Ce 31	Env. Qual. Control	3	Eh 17	Adv. Prof. Expos.	3
Ce 40	Intro. to Struct. Anal.	4	____	Ce Elect.[4]	3
Ce 50	Hydraulics	4	____	Ce Elect.	3
Ce 65	Soil Mechanics	3	____	Ce Elect.	3
			____	H/SS Elect.	3
		17			16

Senior Year

____	Ce Elect.	3	Ce 111	Engr. Proj. Manag.	3
____	Engr. Sci. Elect.	3	Ce 112	Engr. Decisions	3
____	Tech. Elect.	3	____	Tech. Elect.	3
____	Free Elect.	3	____	Free Elect.	3
____	H/SS Elect.	3	____	H/SS Elect.	3
		15			15

Total Credit Hours = 130

Electives:

(1) 18 credits of approved humanities or social sciences.

(2) 4 credits of approved basic science electives in geology, chemistry, physics or life sciences.

(3) 6 credits of approved engineering science electives usually in mechanical or electrical engineering.

(4) Civil engineering electives must include second courses in at least three of the following four areas: (a) Structures, (b) Geotechnical, (c) Environmental—Water Resources, and (d) Transportation—Construction.

(5) Technical electives are advanced level engineering, science or mathematics courses which may be, but are not restricted to, civil engineering courses.

(6) Free electives are either technical or non-technical courses offered for credit by an academic unit or the University. (Remedial courses are excluded.)

Courses in Civil Engineering (Ce)

10. Materials—The structure, properties, and testing of engineering materials and their use in constructed facilities. Topics include: metals, woods, concrete, bituminous mixtures. Rec 3, Lab 2, Cr 4.

25. Transportation Engineering—An introduction to the broad field of transportation with emphasis on the motor vehicle mode. Principles of roadway and urban transportation planning, economic analysis methods, and route design elements are discussed and related to the planning and design of highway transportation routes. Prerequisite: Sv 5 or consent of instructor. Rec 3, Cr 3.

31. Environmental Quality Control—Introduction to environmental engineering. Topics include air and water quality, wastewater treatment, solid waste disposal, and noise pollution. Prerequisite: Ch 13. Rec 3, Cr 3.

40. Introduction to Structural Analysis—The analysis of statically determinate beams, frames and trusses. Introduction to the analysis of statically indeterminate structures. Prerequisite: Me 51. Rec 3, Lab 3, Cr 4.

50. Hydraulics—An elementary course presenting fundamental principles of fluid flow and their applications to engineering problems. Includes study of hydrostatics, liquid measuring devices, and channel and pipe flow. Prerequisite: Me 50. Rec 3, Lab 2, Cr 4.

65. Soil Mechanics—A study of the fundamental physical properties, engineering behavior and performance of soil deposits. Prerequisite: Me 51. Rec 3, Cr 3.

66. Soil Mechanics Laboratory—Laboratory experiments to study the engineering behavior of granular and fine grained soils including classification, density, permeability, shear strength, and consolidation testing of soils. Prerequisite: Ce 65. Lab 2, Cr 1.

99. Thesis—The study and reporting of some original investigation or design. Time to be arranged. Prerequisite: consent of instructor. Cr 2-3.

110. Civil Engineering Practice—Work experience in civil engineering. May be taken more than once. Prerequisite: sophomore standing. Cr 1-3.

111. Engineering Project Management—CPM, PERT, resource leveling and basic principles of management applied to the planning and scheduling of engineering projects. Prerequisite: senior standing or consent of instructor. Rec 3, Cr 3.

112. Engineering Decisions—Economic and non-economic factors that influence engineering decisions. Engineering economy and the business, legal, and ethical factors that affect engineering decisions. Rec 3, Cr 3.

121. Transportation System Planning—This course covers the technical aspects of transport systems planning. Topics include: approaches to system planning, trip generation, model split, trip distribution, route assignment, direct demand modeling, transportation/developement models, and current issues. Prerequisite: Ms 134, or Pol 200 (or concurrent), or permission. Lec 3, Cr 3.

122. Senior Transportation Project—This course provides senior students with an opportunity to "solve" a real world problem which draws on their training to date. Topics differ from year to year, but would generally be defined by the instructor in conjunction with outside agencies (e.g., city planning staff). Prerequisite: permission. Lec 1, Lab 4, Cr 3.

125. Advanced Roadway Design—Design of roadway pavements and surface treatments, capacity analysis, and the geometric design of intersections and interchanges. Prerequisite: Ce 25. Rec 3, Cr 3.

132. Water Supply Engineering Design—Theory and design of water supply, treatment facilities, and distribution works. Laboratory emphasis will be placed on the development of design projects. Prerequisite: Ce 31, 50. Rec 2, Lab 2, Cr 3.

133. Environmental Engineering Chemistry—Fundamental aspects of chemistry emphasizing environmental engineering applications. Laboratory methods for the analysis of water and wastewater. Prerequisite: Ce 31. Rec 2, Lab 3, Cr 3.

134. Wastewater Engineering Design—The theory and design of wastewater collection, treatment, and disposal. Laboratory includes design of sewers, treatment processes, and sludge disposal systems. Prerequisite: Ce 31, 50. Rec 2, Lab 2, Cr 3.

141. Indeterminate Structural Analysis—The analysis of statically indeterminate beams, frames and trusses. Prerequisite: Ce 40. Rec 3, Cr 3.

142. Reinforced Concrete Design—The design and detailing of reinforced concrete structures: buildings, retaining walls, and footings. Prerequisite: Ce 40. Rec 3, Lab 3, Cr 4.

143. Structural Steel Design—The design and detailing of steel structures: tension members, columns, beams, frames, and connections. Prerequisite: Ce 141. Rec 2, Lab 3, Cr 3.

144. Matrix Structural Analysis—The analysis of statically and kinematically indeterminate structures by classical and numerical methods. Prerequisite: Ce 141. Rec 3, Cr 3.

145. Building Design—The conceptual, preliminary and final design of a building project. Economic, engineering, and sociopolitical constraints are considered. Owner, architect, engineer and contractor relationships are explored. Course is professional in nature, utilizing the active involvement of practicing architects, engineers, planners and contractors. Prerequisite: Ce 141. Lec 2, Lab 3, Cr 3.

155. Hydrology—Application of statistical analysis to rainfall and runoff. The collection and presentation of factors affecting rainfall and runoff data. Methods for developing hydrographs and flood routing. Prerequisite: Ce 50. Rec 3, Cr 3.

156. Groundwater Hydrology and Hydraulics—Fundamentals of the mechanics of flow through porous media and application of analytical tools to problems of groundwater flow, supply, and pollution. Prerequisite: Ps 2, Ch 13 and Ms 28 or consent of instructor. Rec 3, Cr 3.

157. Water Resources Engineering and Management—Applications of analytical tools to the solution of water resource problems with emphasis on water quality management in rivers, lakes, and reservoirs. Influence of transport processes, stratification, and heat exchange on water quality. Nutrient transport and eutrophication. Water quality consideration in reservoir sizing, construction, and outlet design. Prerequisite: Ce 50 and senior standing. Rec 3, Cr 3.

158. Coastal Engineering—The principles of hydraulics and civil engineering are applied to civil engineering problems in lakes and coastal areas. Topics include: wave forecasting, shoaling, refraction sediment transport, stability of rubble mound structures, design of coastal structures, linear wave theory, and storm surge. Prerequisite: Ce 50. Rec 3, Cr 3.

160. Applied Soil Mechanics—The application of soil mechanics to practical engineering design and construction problems. Prerequisite: Ce 65. Rec 3, Cr 3.

162. Earthwork Design—Design and construction of earth-supported structures including earth dams, roadway embankments, and earth retaining structures. Prerequisite: Ce 65. Rec 3, Cr 3.

165. Foundations—Introduction to foundation engineering and its structural, soils, and construction components. Prerequisite: Ce 160. Rec 3, Cr 3.

170. Construction Management and Estimating—Management of construction activity with emphasis on cost estimating and bid preparation. Topics include: construction business management, advertising and contracting process, construction plans and specifications, quantity take-off, unit costs, and bid proposals. Prerequisite: Ce 10, 25. Rec 2, Lab 3, Cr 3.

173. Construction Equipment and Methods—The equipment and methods used in heavy and highway construction. Topics include: organizational and legal framework in U.S. construction practice, basic physical and economic principles governing the efficiency of construction practice, and selection of types and combinations of equipment for heavy and highway construction operations. Prerequisite: Ce 170 or consent of instructor. Rec 2, Lab 3, Cr 3.

181. Seminar—Written and oral reports with discussions on assigned topics in any special branch of civil engineering. Cr 1-3.

SURVEYING ENGINEERING

The Surveying Engineering program provides the technical training and analytical capabilities necessary for professional practice of surveying in its broadest sense. Included are the sub-disciplines of: geodesy, engineering and land surveying, land use planning, photogrammetry, resource mapping, cadastral systems, hydrographic surveying and remote sensing. Graduates are well equipped to engage in the traditional areas of surveying, land information consulting and improvement of techniques for collecting, quantifying and mapping the physical information about the earth's surface. The curriculum is also designed to develop an understanding of the legal, social, economic and political mechanisms which affect the practice of surveying engineering. Within the basic framework, the curriculum offers two options: advanced technical studies, and land information studies.

SURVEYING ENGINEERING CURRICULUM

FALL SEMESTER		Hours	SPRING SEMESTER		Hours
Freshman Year					
Sv 5	Plane Surveying	3	Sv 6	Adv. Plane Surveying	3
Sv 70	Evolution of Surveying	3	Eh 1	English Composition	3
Ms 26	Anal. Geom. & Calc.	4	Ms 27	Calculus	4
Ps 1	General Physics	4	Ps 2	General Physics	4
Ge 16	Cartographic Drawing	3	____	H/SS Elect[1]	3
		17			17
Sophomore Year					
Sv 105	Legal Asp. of Survey	3	Sv 106	Land Surveying	3
Ms 28	Calculus	4	Ms 134	Statistics	4
Cs 81	Computer Programming	3	Ms 162	Linear Algebra	4
Me 50	Statics	3	Gy 6	Geology	4
Ch 13	Chem. Principles[2]	4	Ee 22	Network Fund.	3
		17			18
Junior Year					
Sv 75	Adjustment Comp.	3	Sv 181	Geodesy II	3
Sv 80	Geodesy I	3	Sv 184	Remote Sensing	3
Sv 97	Junior Seminar	1	Sv 188	Adv. Photogrammetry	3
IDL 19	Ecological Systems	3	Eh 17	Adv. Profession Expos.	3
IDL 106	Photogrammetry	3	____	Engr. Sci. Elect[3]	3
Ec 10	Economics	3			
		16			15
Senior Year					
Sv 99	Senior Thesis	3	Sv 98	Senior Seminar	1
Sv 107	Cadastral Systems	3	ARE 174	Land Use Planning	3
ARE 171	Land Resource Econ.	3	____	Engr. Design Elect[3]	3
____	Engr. Sci. Elective	3	____	H/SS Elective	3
____	Engr. Sci. Elective	3	____	H/SS Elective	3
____	H/SS Elective	3	____	Free Elective[4]	3
		18			16

Minimum Credit Hours = 132

Electives:

(1) Humanities or social sciences—18 hours required for graduation

(2) Other approved basic science electives may be substituted.

(3) Engineering science and design electives may stress either of the following options:
   (a) Advanced Technical Studies
   (b) Land Information Studies

(4) Free electives are either technical or non-technical courses offered for credit by an academic unit of the University.

Courses in Surveying Engineering (Sv)

5. Plane Surveying—An elementary course presenting fundamental plane surveying concepts including: reference planes and surfaces, distance and angular measurement, traverse computations, horizontal and vertical curves, error propagation, area determination and stadia mapping. Prerequisite: trigonometry in high school. Lec 2, Lab 3, Cr 3.

6. Advanced Plane Surveying—A second course in plane surveying techniques which considers the subject areas of horizontal control networks, state plane coordinate systems, surveying, astronomy, earthwork computations and engineering surveys. Prerequisite: Sv 5, Ms 26. Lec 2, Lab 3, Cr 3.

70. Evolution of Surveying—A definitive overview of the profession of surveying, retracement of the institutions of property and ownership; land survey and recording systems; professionalism; surveying in the United States; the present and future role of surveyors; the relationships between surveyors and users of surveying expertise. No prerequisite. Lec 3, Cr 3.

75. Adjustment Computations—Least squares adjustment as applied in surveying: Observation equation model, condition equations, mixed model, conditions between parameters, sequential solutions, observed parameters, minimal and inner constraint solutions, laboratories. Some concepts of linear algebra and statistics are reviewed. Prerequisite: Ms 134, Ms 162 or consent. Lec 3, Cr 3.

80. Geodesy I—Computations on the ellipsoid, three-dimensional geodesy, conformal mapping. Geometric properties of ellipsoids, normal sections, geodesics, geodetic datum definitions, direct and inverse solutions as well as computing networks on the ellipsoid and on the mapping plane, reduction of observations onto the ellipsoid. Review of spherical trigonometry, differential geometry and complex variables as necessary. Prerequisite: Ms 28, Sv 5. Lec 3, Cr 3.

83. Surveying Engineering Practice—A course intended to apply theoretical concepts introduced in previous surveying, geodesy, photogrammetry and adjustments to the solution of comprehensive problems in surveying engineering. Emphasis will be on laboratory work including field observations. Prerequisite: Sv 6, Sv 181, Sv 188, Sv 75. Lec 2, Lab 3, Cr 3.

97. Junior Seminar—Selected topics of current interest within the surveying profession are discussed by outside speakers and enrolled students. Juniors in Surveying Engineering must research, prepare and present a topic of current interest to the group to receive credit. A paper is required. The seminar is open to anyone who chooses to attend. Prerequisite: junior standing or permission. Lec 1, Cr 0-1.

98. Senior Seminar—Presentations by students and faculty of pertinent happenings in surveying. Discussions based upon term projects, literature reviews, current events, or thesis topics. Professional practice and ethics are explored with members of the surveying community. Each participant prepares and moderates a seminar session. A paper is required. Prerequisite: senior standing or permission. Lec 1, Cr 1.

99. Senior Thesis—A required course by seniors in Surveying Engineering. Includes selecting an area of study with adviser approval, then performing a full literature search, conducting the necessary research and reporting results in thesis format. The thesis must meet University format requirements and be submitted in duplicate to the department. Prerequisite: senior standing. Lec 1, Cr 3.

105. Legal Aspects of Land Surveying—Property law, conveyance of property, recording systems and procedures, interpretation and writing of land description. Prerequisite: Sv 5. Lec 3, Cr 3.

106. Land Surveying—Boundary law, U.S. public land system, subdivision layout and design permit requirements and procedures. Prerequisite: Sv 105. Lec 3, Cr 3.

107. Cadastral Systems—The concepts of property, land tenure and land ethics; land registration systems; the function and design of multi-purpose cadastres; political, economical and social constraints of land information systems. Prerequisite: junior standing. Lec 3, Cr 3.

108. Environmental Law and Resource Regulation—Selected topics in common law solutions to environmental problems, major statutes in air, water, solid waste, and coastal zone

management, environmental litigation, land use controls, water rights. Prerequisite: consent. Lec 3, Cr 3.

181. Geodesy II—Fundamentals of potential theory, boundary-value problems, geoid and gravity field determination, geoid undulations, deflections of the vertical, Stokes and Vening Meinesz formulae, reductions of gravity observations, isostasy, gravimeters, tides, height systems, interpretation of global and local gravity anomalies, gravity gradients, etc. Prerequisite: Sv 80. Lec 3, Cr 3.

184. Remote Sensing—Definition and overview of remote sensing, sensors, signatures and information; electromagnetic radiation, interactive mechanisms; photographic systems, photometry and spectroradiometry; electro-optical sensors, non-imaging sensors, radar system; space platforms; information systems; processing; interpretation; application; practical utility of remotely sensed data; term project. Prerequisite: Ms 28, Ps 2. Lec 3, Cr 3.

185. Geodesy III—Astronomical azimuth, latitude and longitude determination, satellite techniques. Stellar coordinate systems, precession, nutation, proper motion, aberration, parallax, refraction, time systems, field observations of sun and stars; orbital theory of near-earth artificial satellites, satellite Doppler positioning, interferometry, Global Positioning System and related satellite surveying techniques. Prerequisite: Ms 28, Sv 80. Lec 3, Lab 2, Cr 3.

188. Advanced Photogrammetry—Advanced topics in metric photogrammetry including optics, orientation of tilted photos, photo control, stereoscopic plotting instruments, orthophotography, oblique and panoramic photography, terrestrial and close-range photography and photogrammetric control extension. Prerequisite: IDL 106 or equivalent. Lec 2, Lab 3, Cr 3.

189. Analytical Photogrammetry—Concepts of numerical (computerized) processing of large blocks of photogrammetric imagery. Development of collinearity, and coplanarity. Programs will be written to perform interior, relative and absolute orientations. Discuss strip, block and simultaneous bundle adjustments using least squares techniques. Prerequisite: Sv 188. Lec 3, Cr 3.

190. Hydrographic Surveying—Tasks and objectives of hydrographic surveying; mathematical models for offshore positioning systems; instrumentation and positional accuracies; offshore depth determination by echo sounding; reference surface for hydrographic surveys. Prerequisite: Sv 6, Ms 28. Lec 3, Cr 3.

IDL 106. Photogrammetry—Procedure and methods used to derive metric data from photographs. Use of aerial photographs to prepare topographic maps of the earth's surface. Prerequisite: Sv 5. Lec 2, Lab 3, Cr 3.

GRADUATE PROGRAM IN CIVIL ENGINEERING

The Department of Civil Engineering also offers a program of study and research leading to the M.S., M.E. and Ph.D. degrees. A description of the program and general requirements for advanced degrees are described in the Graduate School Catalog.

Graduate Courses

200. City and Regional Planning—Rec 2, Lab 2, Cr 3.

203. Urban Transportation Planning—Lec 3, Cr 3.

205. Traffic Operations and Geometric Design—Rec 3, Lab 3, Cr 3.

206. Traffic Flow Theory—Rec 2, Lab 2, Cr 3.

239. Water Quality—Rec 3, Cr 3.

257. Water Resources Engineering—Rec 3, Cr 3.

258. Advanced Coastal Engineering—Rec 3, Cr 3.

259. Numerical Modeling of Lakes and Estuarine Processes—Rec 3, Cr 3.

298. Selected Studies in Civil Engineering—Variable Cr.

300. Traffic Planning—Rec 3, Cr 3.

301. Traffic Planning II—Rec 3, Cr 3.

310. Transportation Systems and Terminal Design—Rec 3, Cr 3.

331. Physicochemical Processes for Water Quality Control—Rec 2, Lab 3, Cr 3.

332. Biological Processes for Wastewater Treatment—Rec 3, Cr 3.

333. Industrial Wastes—Rec 2, Lab 3, Cr 3.

334. Environmental Engineering Design—Rec 2, Lab 4, Cr 3.

335. Operation and Control of Wastewater Treatment Facilities—Rec 2, Lab 4, Cr 3.

340. Numerical Analysis of Structures—Rec 3, Cr 3.

341. Advanced Indeterminate Structures—Rec 3, Cr 3.

342. Advanced Reinforced Concrete Structural Design—Rec 3, Cr 3.

343. Advanced Structural Steel Design—Rec 3, Cr 3.

344. Structural Members—Rec 3, Cr 3.

345. Ultimate Behavior of Steel Structures—Rec 3, Cr 3.

350.351. Environmental Engineering Seminar—Rec 1, Cr 1.

360. Advanced Soil Mechanics—Rec 3, Lab 3, Cr 4.

362. Earth and Earth Supported Structures—Rec 3, Cr 3.

365. Foundations and Underground Structures—Rec 3, Cr 3.

398. Selected Topics in Civil Engineering—Variable Cr.

399. Graduate Thesis

ELECTRICAL ENGINEERING

Professors Libbey, Myers, Peake (Chairman), Sheppard, Turner, Vetelino; Associate Professors Brown, Field; Assistant Professors, Lee, Mittleman

The Electrical Engineering curriculum is designed to provide students with the relevant skills and the basic scientific background needed to advance today's technology and to keep abreast of future developments in the electrical engineering profession. The program is accredited by the Accreditation Board for Engineering and Technology, Inc.

The early part of the program emphasizes electrical engineering skills which form the background for the upper level elective and design courses. The required and elective electrical engineering courses are supplemented with basic courses in physics, chemistry, and mathematics, while 18 credit hours of humanities electives allow students to expand their cultural and intellectual horizons. Technical electives can be chosen in the junior and senior years when students' individual interests have had a chance to manifest.

Two important features of the Electrical Engineering curriculum are the Ee-100 seminar series and the Ee-190 Project Courses. The Junior/Senior Ee-100 Seminar furnishes career orientation and professional values at a time when it is most appropriate and is designed to make students aware of electrical engineering activities and opportunities. The Ee-190 project course occurs during the last three semesters of the program and allows students to demonstrate engineering abilities by proposing, completing and reporting on detailed design projects.

Students who desire industrial engineering experience can apply for the department's co-op program where individuals can work with industry on current engineering problems; those who are more research-oriented can request the opportunity of working closely with individual faculty members in their areas of interest.

A candidate for the BSEE must maintain an average of at least 1.80 in junior and senior electrical engineering subjects, as well as meeting the requirements in the General Information section of the catalog under "Grading System".

Graduate Work in Electrical Engineering

Programs leading to the degree of master of science in electrical engineering and master of engineering (electrical) are described in the University of Maine at Orono Graduate School Catalog.

ELECTRICAL ENGINEERING CURRICULUM

Freshman Year

FALL SEMESTER		Hours	SPRING SEMESTER		Hours
Ee 71	Microcomputer Arch. & App.	4	Ee 20	Simulation Lab.	1
Ch 13	Chemical Principles[1]	4	Ee 22	Network Fund.	3
or	Humanities Elec.[2]	3	Ee 72	Logic Systems	4
Ms 26	Anal. Geom. & Calc.	4	Ms 27	Anal. Geom. & Calc.	4
Ps 1	General Physics	4	Ps 2	General Physics	4
		16 or 15			16

Sophomore Year

Ee 24	Instrumentation	4	Ee 23	Energy Trans. & Conv.	4
Ee 73	Digital Electronics	4	Ee 62	Mater. Eng.	4
Ch 13	Chemical Principles[1]	4		Humanities Elec.[2]	3
or	Humanities Elec.[2]	3	Ms 59	Diff. Equations	4
Ms 28	Anal. Geom. & Calc.	4			
		16 or 15			15

Junior Year

Ee 100	Seminar	1	Ee 100	Seminar	1
Ee 121	Linear Circ. & Systems	3	Ee 183	Communications Eng.	3
Ee 151	Fields and Waves	3	Ee 190A	Design Proj.	2
Ee 163	Solid State Eng.	3		Technical Elec.[3]	6
	Humanities Elec.[2]	3		Humanities Elec.[2]	3
	Free Elec.[4]	3			
		16			15

Senior Year

Ee 100	Seminar	1	Ee 100	Seminar	1
Ee 190B	Design Proj.	2	Ee 190C	Design Proj.	2
	Technical Elec.[3]	6		Technical Elec.[3]	9
	Free Elec.[4]	3		Humanities Elec.[2]	3
	Humanities Elec.[2]	3			
		15			15

[1]Ch 13, Chemical Principles, is required, but may be postponed until the first semester of the sophomore year according to the orientation and preparation of the student.
[2]18 credit hours of Humanities electives are required. Ordinarily these would be taken as one three credit hour course in each of the last six semesters, but students may interchange one of these with Ch 13 in the first semester of the freshman year as explained in footnote 1, above.
[3]The technical electives must include at least 4 credit hours of basic sciences: e.g. Biology, Chemistry, or Physics. Three credit hours of Thermodynamics and three credit hours of Mechanics or Strength of Materials must be included among the technical electives.
[4]Any University course for which credit is given qualifies as a free elective. Such courses may not be taken pass-fail if they are offered on a graded basis.
TOTAL CREDIT HOURS TO GRADUATE 121

LOWER DIVISION

Electrical Engineering (Ee)

20. Simulation Lab—A computational laboratory introducing the student to higher level language programming and its application in engineering simulation and modelling. Prerequisites: Ee 22 concurrently; required. Lab 3, Cr 1.

22. Network Fundamentals—A basic course which introduces students to the concepts and problems associated with electronic and electrical instrumentation and the transmission and conversion of electric energy. Circuit analysis will be introduced as needed to explain the applications. Prerequisite: Ms 26. Lec 3, Cr 3.

23. Energy Transmission and Conversion—Basic concepts related to electrical power system; computer analysis; power system components and measurements. Prerequisite: Ee 22, Rec 3, Lab 3, Cr 4.

24. Instrumentation—Application and characteristics of electronic instrumentation including the oscilloscope and digital indicators: sensitivity and frequency limitations: meters and bridges: instrumentation systems. Prerequisite: Ee 22. Rec 3, Lab 3, Cr 4.

62. Materials Engineering—Basic characteristics and properties of materials of importance in electrical engineering including semiconductors, dielectrics and magnetic materials. Prerequisite: Ch 13. Rec 3, Lab 3, Cr 4.

71. Microcomputer Architecture and Applications—The microcomputer and its component parts including microprocessors, registers, memory and I/O. Programming and applying the microcomputer in engineering systems. Rec 3, Lab 3, Cr 4.

72. Logic Systems—Introduction to the design of logic systems: combinatorial and sequential logic: use of LSI and MSI including RAM, ROM and PLA's. Rec 3, Lab 3, Cr 4.

73. Digital Electronics—Basic physics and circuit models for electronic devices; analysis of internal circuitry of major IC logic families; combinatorial logic circuit design considerations; latches, flip-flops, counters, registers, Schmitt triggers, and monostable multivibrators; introduction to analog and linear circuitry. Prerequisites: Ee 22 and Ee 72. Rec 3, Lab 3, Cr 4.

UPPER DIVISION

100. Seminar—Written and oral reports with discussions on assigned topics in any special branch of E.E. Includes presentations by students, faculty and outside speakers. May be taken more than once. Prerequisite: Junior-Senior standing. Rec 1, Cr 1.

110. Electrical Engineering Practice—Work experience in electrical engineering. May be taken more than once. Sophomore standing and permission. Cr 3.

121. Linear Circuits and Systems—Physical system behavior in terms of computational modelling; state variables and other mathematical models; mathematical solution techniques employed in E.E. Prerequisite: Ms 59. Rec 3, Cr 3.

123. Analog Electronic Circuits and Systems—Topics in the internal circuit design and system applications of analog integrated circuits; current sources, differential amplifiers, level shifters, op amps, regulators, high frequency considerations; digital-to-analog and analog-to-digital converters, phase-locked loops. Prerequisites: Ee 73 and Ee 121. Rec 3, Cr 3.

125. Control Devices and Systems—Theory and operational characteristics of electromechanical control devices, linear modelling of nonlinear components, transfer functions and their use in analysis of feedback control systems; use of microcomputer for control. Prerequisite: Ee 23 or permission. Rec 3, Cr 3.

151. Fields and Waves—Calculation of the field and properties of some common transmission lines. Pulse propagation on lossless lines. Time harmonic analysis of lossy and lossless lines. Application of these methods to other wave propagation problems. Prerequisite: Ms 59. Lec 3, Rec 3, Cr 3.

153. Microwave Engineering—Microwave measurement techniques, impedance matching; Maxwell's Equations; rectangular and cylindrical wave-guides; antennas. Prerequisite: Ee 151, Rec 2, Lab 3, Cr 3.

155. Electric Power Transmission—Line constants per unit quantities, matrices, load flows studies, symetrical components and study of power system faults. Prerequisite: Ee 23. Rec 2, Comp 3, Cr 3.

156. Electric Power Systems—Economic operation of power systems, system stability, relaying. Prerequisite: Ee 155. Rec 2, Comp 3, Cr 3.

163. Solid State Engineering—Electronic optical and magnetic properties of materials, solid state devices, opto-electronics and acousto-optic phenomena; systems of solid state devices. Prerequisites: Ee 62 or equivalent. Rec 3, Cr 3.

165. Microelectronics—Design principles and fabrication techniques of hybrid and monolithic integrated circuits. Characteristics and state-of-the art technology of passive and active IC components and circuit design. Prerequisite: Ee 163 or equivalent. Rec 2, Lab 1, Cr 3.

171. Microprocessor Applications Engineering—Application of micro-processors to the solution of design problems, including hardware characteristics, peripheral control techniques and system development. Prerequisites: Ee 71, 72. Rec 2, Lab 3, Cr 3.

172. Sequential Logic Systems—Methods of design and test for logic systems with memory. Sequential machine flow charting and algorithmic approaches to design. Test procedures and the design of system tests. Prerequisite: Ee 72. Rec 3, Cr 3.

183. Communication Engineering—Basic principles of modern communication engineering; methods of analysis; modulation techniques; effects of noise; information transmittal. Prerequisite: Ms 59, Ee 121. Lec 3, Cr 3.

184. Communication Engineering II—Digital communication systems, multiplexing, signal space, information theory and coding. Prerequisite: Ee 183. Rec 3, Cr 3.

190. Electrical Engineering Design Project—Proposal, implementation and reporting on a device or system to perform an engineering function. To be accomplished by a single student or group of students. The course is divided into three two-credit semesters. Semester A: Lectures on researching the project, implementation of the design, report and proposal writing, oral presentations. Major emphasis will be on the project proposal. Semester B: Implementation of the design project. This will usually consist of independent laboratory work to build and test the proposed device system. Semester C: Written and oral presentations and documentation. In the normal sequence, this course is taken in the second semester of the junior year and the two semesters of the senior year. In some cases, however, semesters B and C can be combined. Prerequisite: Junior standing. Cr A-2, B-2, C-2. Total Cr 6.

196. Electro-acoustics—Acoustic wave specifications and levels; electro-mechanical and acoustical circuits; electro-acoustic systems of microphones and loudspeakers; fundamentals of architectural acoustics; noise control criteria; instrumentation; prediction of machine noise levels. Prerequisite: senior or graduate standing. Rec 3, with four laboratory periods substituted for equivalent class time. Cr 3.

197. Environmental Noise Control—Sound propagation outdoors, in porous acoustical materials; in solid structures; basic design of mufflers and vibration isolation; air handling system noise control; transportation vehicle noise; statistical specification of industrial and urban noise; rudiments of community noise control. Prerequisite: Ee 196. Rec 3, with occasional laboratory period substituted for equivalent class time. Cr 3.

198. Selected Topics in Electrical Engineering—Topics in electrical engineering not regularly covered in other courses. The content can be varied to suit current needs. The course may, with permission of the department, be taken more than once. Prerequisite: consent of the department. Cr 1-3.

199. Thesis—The study of and report upon some original investigation or design. See regulations regarding degrees. Cr 1-3.

IDL 150. Optical Communications—Major components used in optical communications, processing, and storage are studied through theoretical and experimental investigation of the fundamental properties of light and its interaction with matter. Prerequisite: Ps 172. Rec 3, Cr 3.

IDL 198. Undergraduate Research Participation—Research topics to be chosen by the students in consultation with faculty members in the departments and programs in the College of Engineering and Science. Students are required to submit a final report describing their research and present an oral seminar. Cr 1-3.

Graduate Courses

222. Transients in Linear Systems—Rec 3, Cr 3.

250. Electromagnetic Waves—Rec 3, Cr 3.

265. Solid State Electronics I

280. Communication Engineering—Rec 3, Cr 3.

298. Selected Advanced Topics in Electrical Engineering—Cr 1-3.

399. Graduate Thesis—Cr 6-10.

ENGINEERING PHYSICS

Professors Morrow (Chairman), Brownstein, Camp, Carr, Clark, Csavinszky, Hooper, Krueger, Smith, Tarr; Associate Professors Harmon, Hess, Rooney, Vietti; Assistant Professors Comins, Kleban, Mountcastle, Unertl

This curriculum was developed to meet the needs of students who have a strong interest in engineering, but are not committed to a single traditional engineering field. It affords students, who are not yet sure of their specific career goals, the opportunity to maintain a high degree of flexibility. This program is basically one of applied science, supplemented by a sequence of technical electives in one or more of the well-defined engineering or science fields. It is developed around a framework of required courses in intermediate and advanced physics, mathematics, and chemistry, in addition to certain strictly engineering courses, some required and some elected in the last three years. Thus, the emphasis is placed upon both engineering and physics. The program is accredited by the Accreditation Board for Engineering and Technology, Inc.

The curriculum also is suited for those students who, by virtue of their ability and interest, may be preparing to do graduate work. Graduates have successfully pursued graduate study in physics and in various fields of engineering.

Engineering Physics and Cooperative Education

Students in good standing enrolled in the Engineering Physics curriculum who are completing their second year of undergraduate work have available the option of working for their degree within a Cooperative Education Program. Cooperative Education is the integration of practical work experience, obtained through specific periods of employment in industry, business or government, into the on-campus classroom and laboratory course curriculum. A student in the Cooperative Education program works as a paid employee in an engineering environment at a job selected by mutual agreement with the student, the employer, and the cooperative education coordinator of the Department of Physics. Academic credit is received through enrollment in Ps 194, Field Experience in Physics.

Courses in Engineering Physics (Ps)

Consult courses listed under Physics and Astronomy in the College of Arts and Sciences.

Graduate Work in Physics

Graduate opportunities and requirements for the Master of Science degree and the Doctor of Philosophy degree in Physics, and the Master of Science degree in Engineering Physics are given in the catalog of the Graduate School.

ENGINEERING PHYSICS CURRICULUM

The following course schedule represents the program for a typical student in the Engineering Physics curriculum. There are possible alterations to this schedule and substitutions may be made for some courses on approval of the Chairman of the Department of Physics. Students desiring to transfer from another engineering program in their freshman or sophomore year may do so without loss of credit or delays in graduation. The considerable flexibility in the Engineering Physics program will allow a student to design an individual curriculum with the assistance of his adviser.

Freshman Year

	FALL SEMESTER	Hours		SPRING SEMESTER	Hours
Ps 1	General Physics	4	Ps 2	General Physics	4
Ch 13	Chemical Principles	4	Ch 14	Chemical Principles	4
Ms 26	Analytic Geom. & Calc.	4	Ee 22	Network Fund.	3
Ee 71	Microcomp. Arch. & App.	4	Ee 20	Simulation Lab	1
			Ms 27	Anal. Geom. & Calc.	4
		16			16

Sophomore Year

Ps 36	Intro. to Modern Phys.	3	Ps 18	Elect. & Mag. I	3
Ps 19	Intermediate Lab.	1	Ps 20	Intermediate Lab.	1
Ms 28	Anal. Geom. & Calc.	4	Ms 59	Differential Eqns.	4
Ge 1	Intro. to Eng. Design	2	Ge 2	Intro. to Eng. Design	2
	[1]Engin. Sequence I	3-4	10 Met	Machine Shop Practice	3
	[2]Humanity Elective I	3		Engin. Seq. II	3
				Humanity Elective II	3
		16-17			19

Junior Year

Ps 117	Mechanics	3	Ps 155	Elec. & Mag. II	3
Ps 153	Elect. Meas.	2	Ps 172	Optics	3
Ms 153	P.D. Equations	3	Ps 176	Physical Meas.	2
	Engin. Sequence III	3	Ms 154	P.D. Equations	3
	Humanity Elect. III	3		Engin. Sequence IV	3
	*Free Elective (Optional)	3		Humanity Elective IV	3
		14-17			17

Senior Year

Ps 169	Atomic Physics	3	Ps 182	Advanced Lab	3
Ps 181	Advanced Lab	3	Ps 198b	Seminar	1
Ps 198a	Seminar	0		Humanity Elective VI	3
	Humanity Elective V	3		Physics Elective	3
	[1]Physics Elective	3		[2]Technical Elective	3
	Free Elective	3		Free Elective	2-3
		15			15-16

Total Hours **128**

[1]Engineering Sequence: An approved sequence of at least four three-credit engineering courses following the freshman year.
[2]Humanity electives: 18 credit hours required. In addition, students may be required to take Eh 1, Freshman Composition.
[3]Physics electives:
Fall: Ps 161, Adv. Meteorology; Ps 157, Biophysics; Ps 162, Thermodynamics; Ps 201 Mechanics; As 150 Astrophysics I; IDL 150 Optical Communications.
Spring: Ps 163, Statistical Physics; Ps 170 and Ps 170L, Nuclear Physics; Ps 196, Physics of Materials; Ps 220 Quantum Mechanics; As 151 Astrophysics II.
[4]Technical elective: Physics, Engineering, Math, or approved Science course.

Students admitted to the Honors program can substitute honors courses for appropriate humanity and physics courses.

FOREST ENGINEERING

Professors Corcoran, Smith

The Forest Engineering curriculum, a joint administrative responsibility of the Agricultural Engineering Department and the School of Forest Resources, combines study of basic physical sciences, mathematics, engineering and forestry to provide students with the in-depth training necessary in a career emphasizing the design, planning and management of tree harvesting systems, logging equipment and environmental engineering in general.

Forest Engineering is engineering in a natural environment. Forest engineers are involved in reforestation methods, systems for wood production and harvesting, handling and transportation, forest road systems, design of improvised bridges, soil-water control and conservation and recreational development.

A unique feature of the Forest Engineering curriculum is that it provides the academic background necessary for full association with both professional engineering and forestry societies. Founded upon intensive study in the physical and natural sciences, the professional subject matter contained in the program is directed toward on-campus as well as off-campus study. The realities encountered in the use of mechanized logging equipment in a natural environment are recognized as the inherent constraints imposed by the interaction of technology, biology and social order.

FOREST ENGINEERING

The curriculum in Forest Engineering is a joint responsibility of the College of Engineering and Science and the College of Life Sciences and Agriculture and is accredited by the Accreditation Board for Engineering and Technology, Inc. and through the Society of American Foresters.

The curriculum requires completion of 139 degree hours (including 6 degree hours in Forestry Summer Camp) at an accumulative degree point average of not less than 2.0.

Freshman Year

FALL		Hours	SPRING		Hours
AE 20	Prin. of Mechanization	3	AE 55	Materials in Ag. Eng.	3
Fy 1	Intro. to Forest Res.	0	Bio 1	Basic Biology	4
Ge 1	Intro. to Design	2	Ge 7	Comp. Prog.	3
Ms 26	Anal. Geom. & Calc.	4	Ms 27	Anal. Geom. & Calc.	4
Ps 1	General Physics	4	Ps 2	General Physics	4
	Elective	3			
		16			18

Curriculum			**Credit Hours**
Basic Sciences and Math			49
Ch 11/12	Chemistry	8	
Ps 1 & 2	General Physics	8	
Ms 26, 27, 28, 59	Calculus & Diff. Equations	16	
Ge 7 (or Cs 81)	Computer Programming	3	
Bio 1	Basic Biology	4	
Fy 4 (or Ms 134)	Statistics	3	
	*Bio-Earth Science Electives	7	
Engineering			36
Ge 1 (or 16)	Intro. to Design	2	
Sv 5	Surveying	3	
Me 33	Thermodynamics I	3	
Me 50	Statics	3	
Me 51	Strength of Materials	3	
Me 52	Dynamics	3	
Me 59	Fluid Mechanics (or Ce 50 Hydraulics)	3	
AE 20	Principles of Mechanization	3	
AE 55	Materials in Ag. Eng.	3	
AE 165	Soil & Water Engineering	4	
IDL 173	Forest Roads & Structures	3	
IDL 174	Forest Power and Machinery	3	
Forestry			32
Fy 1	Intro. to Forest Res. (Audit)	0	
Fy 5	Forest Biometry	3	
Fy 6	Protogrammetry & Remote Sensing	3	
Fy 7	Silvics (Forest Ecology)	4	
Fy 8	Silviculture	3	
Fy 13	Harvesting of Forest Crops	2	
Fy 41s	Summer Camp	6	
Fy 146	Forest Policy & Administration	3	
Fy 149	Timber Mgmt. & Valuation	4	
Fy 171	Production Analysis in Forestry	2	
Fy 172	Planning & Control of Forest Operations	2	
Humanities, Social Sciences, and Communications			22
	Communications	6	
	Economics	6	
	Electives	10	
	TOTAL		139

*Recommended Bio-Earth Science electives include:

S3	Forest Soils
Bt 33	Dendrology
Bt 156	Forest Pathology
	Forest Entomology

GENERAL ENGINEERING

The School of Engineering Technology offers General Engineering service courses for students majoring principally in engineering and forestry.

General Engineering (Ge)

1/2. Introduction to Engineering Design—Exercises in multiview drawing using freehand and instrumental techniques. Course 2 introduces pictoral drawing, descriptive geometry. Concludes with preparation of working drawings for an elementary design problem requiring creative thinking. Rec & Lab 4, Cr 2.

3. Descriptive Geometry—The solution of problems of a three-dimensional nature by graphic methods. Theoretical and applied problems are given. Prerequisite: Ge 1. Rec & Lab 4, Cr 2.

7. Computer Programming for Engineers—Introduction to computer aided design using digital programming to solve engineering applied problems involving numerical methods and matrix algebra. Prerequisite: Ms 26. Lec 1, Rec 2, Cr 3.

14. Architectural Drawing—The preparation of floor plans, elevations, sections, and pictorial renderings of homes and small buildings. Prerequisite: a basic Ge or GeT drawing course or permission. Lec & Lab 4, Cr 3.

16. Cartographics—Graphic principles, concepts, and techniques involving applied problems and creative exercises in orthographic projection, data analysis, and cartography. Rec & Lab 4, Cr 3.

120. Engineering Decision-Making—Application of the elements of engineering decision-making common to all disciplines in engineering. Explanation of the application of concepts of rate of return equivalents, economic lifetime depreciation, annual cost and engineering economic analysis. Prerequisite: college algebra and junior standing. Open to students in all colleges. Rec 2, Cr 2.

MECHANICAL ENGINEERING

Professors Clifford, Grant, Hill, Levinson*, Lyman, Schmidt (Chairman), Sucec; Associate Professors Chapman, Johnson; Assistant Professors Mall, Poland, Ryan

This program is accredited by the Accreditation Board for Engineering and Technology, Inc. (ABET).

Mechanical engineering is responsible for applying and creating knowledge in the fields of mechanics and heat or thermal science. Mechanics studies the interaction between forces and objects, the transmission of forces through materials, the motions and deformations that fluid and solid materials receive from applied forces, the methods of producing forces and of mechanically transmitting energy. Thermal science studies the methods of producing high temperature sources and refrigerated regions of thermal energy, the transmission and use of this energy and its conversion to other useful forms such as electricity and the motion of vehicles.

The program provides the education that is needed for the pursuit of professional careers in both mechanics and thermal science based activities of mechanical engineering. The program has 12 elective courses among the total of 41 courses required for the degree. By careful use of this flexibility students may pursue in depth their particular interests in technical and non-technical subjects. Student design and experimental projects are a learning-by-doing characteristic of the program's senior year. This breadth and flexibility results in a wide choice of opportunities upon graduation, including law and graduate business administration.

Mechanical engineers are employed in all industries. Their activities include equipment and product design and development, field installation and service of equipment and systems, manufacturing processes design and management, sales, research, teaching and administration. Many graduates become self-employed as professional consulting engineers or in operating their own technically based companies.

*Arthur O. Willey Professor of Mechanical Engineering.

Graduate Work in Mechanical Engineering

Programs leading to the degree of master of science in mechanical engineering and master of engineering (mechanical) are described in the University of Maine at Orono Graduate School catalog.

ME-EE Double Majors

A student working towards a BSME degree may also earn a BSEE degree by taking the additional courses: Ee 62, 71, 72, 73, 100, 121, 151, 163, 183, and 190. Some of these may also satisfy technical elective requirements and EE 62 may satisfy the basic science elective requirement in the Me curriculum. If an electromechanical design project is selected for Me 125, the same project might also satisfy four credits for Ee 190. Usually one extra year will be required to earn both degrees.

Mechanical Engineering Department Cooperative Education Program

The Mechanical Engineering Department provides students the opportunity of participating in a Cooperative Education Course, Me 197. The course is under the direction of a Mechanical Engineering Co-op Coordinator who is the adviser to the student during the student's tenure in the course.

Pulp and Paper Option in Mechanical Engineering

This senior year mechanical engineering and fifth year pulp and paper program is described in the Chemical Engineering section of this catalog. It leads to the BSME degree and the Pulp and Paper certificate.

Pre-Nuclear Engineering Option

Mechanical engineering majors interested in nuclear engineering can specialize in this field by electing particular technical courses in mechanical engineering, physics or chemistry. This option is described in the Engineering Physics section of this catalog.

MECHANICAL ENGINEERING CURRICULUM

Freshman Year

	FALL	Hours		SPRING	Hours
Ms 26	Calculus	4 0 4	Ms 27	Calculus	4 0 4
Ps 1	Physics	3 3 4	Ps 2	Physics	3 3 4
Ge 1	Design	0 4 2	Ge 2	Design	0 4 2
Me 50	Statics	3 0 3	Ge 7	Computer	3
	Elective (1)	3		Elective (2)	3
		16			16

Sophomore Year

Ms 28	Calculus	4 0 4	Ms 59	Diff. Equations	4 0 4
Ch 13	Chemistry	3 3 4	Ee 22	Network Fund.	3 0 3
Me 33	Thermodynamics I	3 0 3	Me 34	Thermodynamics II	3 0 3
Me 51	Strength of Mat.	3 0 3	Me 52	Dynamics	3 0 3
	Elective (3)	3		Elective (4)	3
		17			16

Junior Year

Ee 24	Elect. Inst.	3 2 4	Me 21	Mat. Eng. & Sci.	3 0 3
Me 8	Mfg. Processes	1 4 3	Me 164	Vibrations	3 0 3
Me 59	Fluid Mechanics	3 0 3	Me 38	Mech. Lab. I	1 3 3
Me 123	Design I	3		Elective (6)	3
	Elective (5)	3		Elective (7)	3
		16			15

Senior Year

Me 71	Mech. Lab. II	0 3 2	Me 72	Mech. Lab. III	0 3 2
Me 124	Design II	2 3 3	Me 125	Design III	4 0 4
Me 160	Heat Transfer	3 0 3	Ee 23	Elect. Mach.	4
	Elective (8)	3		Elective (11)	3
	Elective (9)	3		Elective (12)	3
	Elective (10)	3			
		17			16

The curriculum contains twelve elective courses, six of which (18 credit hours) must be approved humanities or social sciences, four must be technical with one course selected from each of four specified groups, and two are free electives.

Courses in Mechanical Engineering (Me)

8. Manufacturing Processes—Theory and application of modern metal shaping machines and processes. Design analysis for economical fabrication. Characteristics and operation of machine tools. Prerequisite: junior standing in mechanical engineering. Rec 1, Lab 4, Cr 3.

11. Introductory Engineering Metallurgy—The microstructure of metals and its relation to mechanical properties. Thermal and mechanical processes to control microstructure. Not for mechanical engineering degree credit. Rec 3, Cr 3.

12. Elementary Heat Power—Elementary thermodynamics, mechanical apparatus, power plant equipment; engineering calculations relative to heat, power, work, and mechanical and electrical energy. Not for mechanical engineering degree credit. Rec 3, Cr 3.

21. Materials Engineering and Science—The principles of material science with emphasis on the relationship between structure and properties and their control through composition, mechanical working and thermal treatment. Prerequisite: Me 33, 51. Rec 3, Cr 3.

33. Thermodynamics I—Energy and energy transformations; the First and Second Laws applied to systems and to control volumes; thermodynamic properties of systems, availability of energy. Prerequisite: Ms 27, Rec 3, Cr 3.

34. Thermodynamics II—A continuation of Me 33. Thermodynamics of mixtures; chemical thermodynamics, thermodynamics of fluid flow, vapor and gas cycles, applicable to compressors, internal combustion engines and turbines. Prerequisite: Me 33. Rec 3, Cr 3.

38. Mechanical Laboratory I—An introduction to experiment design, data analysis, laboratory techniques, instrumentation, and calibration of equipment. Application to thermodynamics, mechanics of materials, fluid mechanics and metallurgy. Prerequisite: Ms 59, Me 51, Me 59. Rec 1, Lab 3, Cr 3.

50. Applied Mechanics: Statics—The study of force systems and equilibrium, structural models, friction, distributed forces. Designed to develop the ability to analyze and solve engineering problems. Rec 3, Cr 3.

51. Strength of Materials—The principles of solid mechanics and their applications to practical problems, stresses and deflections in axial loading, torsion, beams, columns, combined stresses. Prerequisite: Me 50 and Ms 27. Rec 3, Cr 3.

52. Applied Mechanics, Dynamics—Motion of particles and rigid bodies; force, mass and acceleration; impulse and momentum; work and energy and simple harmonic motion. Prerequisite: Me 50 or Me 55, Ms 28. Rec 3, Cr 3.

55. Statics and Strength of Materials—The basic principles of statics and their applications in strength of materials. Equilibrium of various systems. Stresses and deformations of axially loaded members connections, circular shafts, beams and columns. Prerequisite: Ms 27. Rec 3, Cr 3.

59. Fluid Mechanics—Fluid statics, kinematics, Bernoulli equation, momentum, free-surface flow, viscosity, friction, dimensional analysis and similitude, and an introduction to compressible flow. Prerequisite: Me 33 and Me 52. Rec 3, Cr 3.

62. Heat Transfer and Fluid Flow—For non-mechanical engineers. The laws of conduction, convection, and radiation of heat energy. Principles of fluid flow for non-viscous and viscous fluids. Application of the principles of heat transfer and fluid flow to engineering problems. Prerequisite: Me 33. Rec 3, Cr 3.

71/72. Mechanical Laboratory II/III—A continuation of Me 38. Mechanical engineering problems in a laboratory setting. Prerequisite: Me 34, 38, 164 or permission. Lab 3, Cr 2.

99. Seminar—Rec 1, Cr Ar.

101. Metallography—Methods of preparation of metal specimens for optical microstructure examination. Microstructure interpretation. Effect of processes on microstructure. Photomicroscopy. Microhardness testing. Experimental problems. Prerequisite: Me 21 or permission. Lab 6, Cr 3.

121. Thermal and Mechanical Processing of Engineering Metals—Microstructure and mechanical property control of carbon and alloy engineering steels, tool steels, stainless steels, cast irons and selected nonferrous alloys through heat treatment and mechanical working. Constriants imposed on design, fabrication, and service environment by processing. Failure analysis. Prerequisite: Me 21, Lec 3, Cr 3.

123. Design I—Kinematical design of machines. Prerequisite: Me 52. Cr 3.

124. Design II—Analysis of mechanical elements. Advanced concepts in mechanics of materials, stress concentration, fatigue, factor of safety. Introduction to creative synthesis and economic design. Prerequisite: Me 51 or 55 and Ms 59. Rec 2, Comp 3, Cr 3.

125. Design III—Design of mechanical engineering systems, including problem definition, analysis, synthesis and optimization. Prerequisite: Me 160, Me 124, or permission. Rec 4, Cr 4.

150. Experimental Mechanics—Experimental methods and techniques for analysis of stress and displacement and their engineering significance. Electric strain gages, brittle lacquers, mechanical and optical strain gages, and introduction to photoelasticity. Prerequisite: Ms 51. Rec 2, Lab 2, Cr 3.

156. Theory of Elasticity—Plane stress and plane strain, stress function. Problems in Cartesian and polar coordinates. Photo-elasticity, strain energy. Three-dimensional problems. Prerequisite: Me 51. Rec 3, Cr 3.

157. Advanced Dynamics—Particle dynamics, planetary motion, projectiles, variable mass motion, angular momentum, impact. Generalized constraints, coordinates and forces. Hamilton's principle. Lagrange's equations. Gyroscopes. Prerequisite: Me 52. Cr 3.

158. Advanced Strength of Materials—Limitations of elementary stress formulas, theories of failure, unsymmetrical bending, beams, plates, torsion of non-circular bars, thick-walled cylinders, stress concentrations, energy methods, and introduction to theory of elasticity. Prerequisite: Me 51. Rec 3, Cr 3.

160. Heat Transfer—The fundamental laws of heat transfer by conduction, convection and radiation. Application to the study of engineering problems via analytical, numerical, and graphical techniques. Prerequisite: Me 59. Rec 3, Cr 3.

163. Solar-Thermal Engineering—An introduction to the fundamentals of solar energy collection and use as process thermal energy. Performance analysis of solar collectors and thermal energy storage devices both separately and combined as a system. Prerequisite: Me 33. Rec 3, Cr 3.

164. Mechanical Vibrations—Free and forced vibrations with viscous damping for discrete and continuous mass systems. Derivation and application of energy methods. Applications. Prerequisite: Me 52, Rec 3, Cr 3.

175. Introduction to the Finite Element Method—Development of finite element approximations and application to problems in fluid mechanics, heat conduction, and solid mechanics. Emphasis is on obtaining numerical values for specific physical problems. Prerequisite: Ms 59, Rec 3, Cr 3.

181. Turbomachine Design—The theory and design of turbomachinery flow passages; control and performance of turbomachinery; gas-turbine engine process. Prerequisite: Me 33, Rec 3, Cr 3.

186. Power Plant Design & Engineering—Power station engineering and economy. Design, construction and operating theory of steam, internal-combustion, and hydroelectric power plants. An introduction to nuclear power plants, utilization of solar energy, fuel cells, and associated problems. Prerequisite: Me 33. Rec 3, Cr 3.

190. Thermodynamic Design of Engines—An introduction to combustion, with applications to the design of propulsion systems, such as gas turbines, I-C engines, rocket engines. Prerequisite: Me 34. Rec 3, Cr 3.

191. Heating and Ventilating System Design—Determination of heating ventilating requirements for buildings and industrial processes. Analysis of heat transfer devices and their applications. Heating and ventilating systems designs, layout and control. Prerequisite: Me 33. Rec 3, Cr 3.

193. Internal Combustion Engines—Application of thermodynamic laws and principles to internal combustion engine cycles, design and operation; fuels and combustion, carburetion, detonation, cooling, and lubrication. Prerequisite: Me 33. Rec 3, Cr 3.

194. Introduction to Nuclear Engineering—Review of nuclear reactions. Neutron interactions and the fission process. Criticality calculations. Steady state behavior of simple reactors. Transient behavior and control of reactors, effect of delayed neutrons. Prerequisite: Ch 14, Ps 2, Ms 59, or permission. Cr 3.

195. Compressible Fluid Flow I.—The dynamics of compressible flows. Fundamental equations and concepts will be considered in isentropic flow, normal shock waves, flows in constant area ducts, and generalized one-dimensional continuous flow. Prerequisite: Me 33 and 59. Rec 3, Cr 3.

196. Refrigeration and Air Conditioning System Design—Methods of producing artificial low temperatures. Refrigeration for controlled-temperature applications in comfort air conditioning and industrial manufacturing processes and their control. Prerequisite: Me 33. Rec 3, Cr 3.

197. Mechanical Engineering Practice—Fulltime engineering work with participating companies of the Mechanical Engineering Department Cooperative Education Program. Course may be taken more than once. Cr 3.

Graduate Courses

202. Advanced Thermodynamic Design of Engines—Rec 3, Cr 3.

210. Advanced Heat Transfer I—Rec 3, Cr 3.

220. Advanced Fluid Mechanics I—Rec 3, Cr 3.

231. Fatigue Failure—Rec 3, Cr 3.

233. Introduction to Continuum Mechanics—Rec 3, Cr 3.

234. Advanced Vibrations I—Rec 3, Cr 3.

235.236. Mechanical Engineering Analysis—Rec 3, Cr 3.

238. Advanced Vibrations II—Rec 3, Cr 3.

240. Fracture Mechanics—Cr 3. Permission.

304. Selected Topics in Advanced Thermodynamics—Rec 3, Cr 3.

311. Advanced Heat Transfer II—Rec 3, Cr 3.

312. Advanced Topics in Heat Transfer—Rec 3, Cr 3.

330. Theory of Plates and Shells—Rec 3, Cr 3.

391. Mechanical Engineering Projects—Cr Ar.

399. Graduate Thesis—Cr Ar.

School of Engineering Technology

Director Gorrill; Professors Webster, Westfall; Associate Professors Crosby, Hamilton, Metcalf; Assistant Professors McDonough, Messier, Viger; Instructors Madden, Morin; Lecturers Beutel, Grenci

Engineering Technology programs are offered in Civil, Electrical and Mechanical Engineering Technology. The programs are designed on a "two-plus-two" basis, i.e., two years for an associate degree and two additional years for a bachelor's degree.

Associate of Science in Engineering Technology

Associate degree programs are offered in Civil, Electrical and Mechanical Engineering Technology. The programs are designed to develop a technical competence for a career as an engineering technician, and as a basis for further study. The three programs are accredited by the Accreditation Board for Engineering and Technology Inc.

Graduation Requirements

1. An accumulative average of 2.0.
2. Passing grades in all required courses in the program of study.
3. A minimum of 69 degree hours.

Bachelor of Engineering Technology

Bachelor's programs are offered in Electrical and in Mechanical Engineering Technology. The programs are designed to further the technical competence of an associate degree graduate for a career as an Engineering Technologist.

Admission Requirements

1. Successful completion of associate degree studies at a level substantially above the minimum requirements.
2. Recommendation of the student's academic adviser and the director of the school.

Graduation Requirements

1. An accumulative average of 2.0.
2. Passing grades in all required courses in the program of study.
3. A minimum of 64 degree hours beyond the associate degree studies.

Pre-engineering Technology

A program of diagnostic testing and developmental studies in mathematics, English and reading is available at Bangor Community College. The purpose of the program is to prepare students to assume a full academic load.

CIVIL ENGINEERING TECHNOLOGY

The curriculum is designed to provide the student with a basic grounding in the physical and mathematical sciences as preparation for his specialized studies in Civil Engineering Technology. These specialized studies are coordinated so as to prepare the graduate to assist as an aide to professional civil engineers in the areas of surveying, materials testing, highway engineering, construction engineering and structural engineering.

The emphasis in all the work is on the practical aspects of civil engineering design and construction. Employment opportunities are excellent for the well-trained engineering technician in the construction field.

Civil Engineering Technology
Curriculum
Associate of Science

	SEMESTER 1	R	L	C		SEMESTER 2	R	L	C
1 Cet	Plane Surveying	3	3	4	2 Cet	Advanced Surveying I	3	3	4
4 Eng	Speech	3	0	3	11 CeT	Structural Mechanics	4	0	4
21 GeT	Technical Drawing	2	3	3	21 CeT	Materials, Prop. & Testing	3	2	4
2 Mst	Algebra & Trig.	3	0	3	8 PsT	Basic Physics	3	0	3
7 PsT	Basic Physics	4	2	5	4 MsT	Anal. Geo. & Intro. Cal.	3	0	3
		15	8	18			16	5	18

	SEMESTER 3					SEMESTER 4			
2 ARE	Economics	3	0	3	30 CeT	Highway Engineering	3	2	4
12 CeT	Structural Design	3	2	4	31 CeT	Construction Engineering	3	3	4
22 CeT	Construction Materials	2	2	3	40 CeT	Civil Eng. Mgt.	3	0	3

6 MsT	Intro. Cal.	3	0	3	Hum. or Soc. Sci. Elec.	3	0	3
3 Eng	Crit. Written Expression	3	0	3	Technical Elective	3	0	3
30 GeT	Construction Drawing	0	4	2				
		14	8	18		15	5	17

Technical Electives: 13 CeT, Ce 105, IDL 106, 8 ARE, 12 ARE, 20 ARE, Ba 9, and Ms 18 or 19.

Courses in Civil Engineering Technology (CeT)

1. Plane Surveying—Surveying instruments and their use in line measurement, leveling and traversing. Construction and drawing of plans, profiles, and topographic maps. Rec 3, Lab 3, Cr 4.

2. Advanced Surveying I—Adjustment of surveying instruments, legal aspects of property surveys; use of the theodolite and electronic distance measuring instruments; precise leveling; horizontal and vertical curve computation and layout. Prerequisite: 1 CeT. Rec 3, Lab 3, Cr 4.

3. Special Topics in Surveying—An in-depth look at selected higher-order survey techniques. Main topics include: geodetic reference surfaces; horizontal and vertical control surveys; problems of resection and intersection; State Plane coordinates; geodetic astronomy and photogrammetric control surveys. Prerequisite: 1 CeT, 2 CeT. Rec 2, Lab 3, Cr 3.

4. Elementary Surveying—The use of surveying instruments and the various methods used for plane surveying. Stadia and mapping work. Course is for forestry technology students only. Prerequisite: 2 MsT or equivalent. Rec 2, Lab 3, Cr 3.

11. Structural Mechanics—Analytical and graphical solutions of force systems. Load, shear, moment and deflection values are solved for in beams, trusses, and frames under static loading. Studies of stresses and strains that occur as structural members are subjected to shearing, tensile, compressive and flexural forces. Prerequisite: 7 PsT. Rec 4, Cr 4.

12. Structural design—Fundamental analysis and design of beams and columns in steel, wood and concrete. Current design codes and practices are used. Prerequisite: 11 CeT. Rec 3, Lab 3, Cr 4.

20. Selected Topics in Civil Engineering Technology—Topics in Engineering Technology not regularly covered in other courses. The content is varied to suit individual needs. The course may be taken more than once. Prerequisite: consent of the instructor. Cr Ar. 1-4 hrs.

21. Material Properties and Testing—The study and testing of the properties of materials (timber, steel, concrete, and aggregates) used in civil engineering construction. Also, an introduction to elementary statistics as it relates to the evaluation of data from the tests of construction materials. Corequisite: 11 CeT. Rec 3, Lab 2, Cr 4.

22. Construction Materials—A continuation in the study of the properties of materials used in civil engineering construction. Subjects covered are bituminous materials, soils — including index properties, classification systems, moisture, drainage, frost action, and site investigations, and masonry products. Prerequisite: 21 CeT. Rec 2, Lab 2, Cr 3.

30. Highway Engineering—History of highways, systems and organizations. Highway financing and economy. Data collection and surveys. Design of the horizontal and vertical alignments and the cross-section, base and pavements. Roadside developments, maintenance, right of way and highway drainage. Construction of the roadway from clearing to paving, including use of the mass diagram. Prerequisite: 2 CeT or concurrent. Rec 3, Lab 2, Cr 4.

31. Construction Engineering—Contractor-oriented aspects of civil engineering management. Project cost estimates, scheduling using CPM 1 and construction safety. Use and economics of construction equipment. Field trips and movies used to illustrate construction practices. Prerequisite: 30 CeT or concurrent. Rec 3, Lab 3, Cr 4.

40. Civil Engineering Management—Office aspect of civil engineering management. Basics of contract law. Writing specifications for a contract and interpreting specifications for inspection. Professional ethics, arbitration and the engineer as an expert witness. Distinguishing relationships in partnerships and corporations. Prerequisite: 2 ARE or concurrent. Rec 3, Cr 3.

ELECTRICAL ENGINEERING TECHNOLOGY

The purpose of this two-year program is to prepare the student for practical work in the application of electrical engineering principles to equipment and instrumentation. Graduates will

find employment opportunities in all types of industry, in large firms as responsible assistants to electrical engineers, and in small firms whose electrical needs include some knowledge of the theoretical basis of electrical applications. Students who successfully complete four semesters may be awarded an associate degree in electrical engineering technology. Students who want to continue and whose records indicate a high probability of successful completion of advanced work may continue for another two years and upon successful completion of eight semesters will be awarded the bachelor's degree in electrical engineering technology.

Electrical Engineering Technology Curriculum

Associate of Science

	SEMESTER I	**R**	**C**	**C**		**SEMESTER II**	**R**	**C**	**C**
2 Eng	Crit. Appre. of Lit.	3	0	3	4 Eng	Speech	3	0	3
3 Eng	Crit. Written Expression	3	0	3	9 Met	Machine Shop & Welding	1	4	3
11 EeT	Basic Electricity	2	3	3	21 EeT	Basic Circuits	3	6	5
1 GeT	Technical Drawing	0	4	2	22EeT	Basic Methods of Tech. Computation	0	4	2
2 MsT	Algebra & Trigonometry	3	0	3	2 GeT	Technical Drawing	0	4	2
7 PsT	Basic Physics	4	2	5	4 MsT	Anal. Geo. & Intro. Cal.	3	0	3
		15	9	19			10	18	18
	SEMESTER III					SEMESTER IV			
33 EeT	Electronics	3	6	5	43 EeT	Applied Electronics	3	3	4
20 EeT	Selected Topics	2	3	3	45 EeT	Microcomputers, Arch. & Applications	3	3	4
35 EeT	Electrical Machinery	3	6	5	1 ChT	Intro. to Chem. Tech.	3	3	4
37 EeT	Techniques of Electrical Measurement	2	3	3	48 EeT	Electrical Projects	0	6	2
6 MsT	Introductory Calculus	3	0	3		**Non-Technical Elective*	3	0	3
		13	18	19			12	15	17

Total Degree Hours Required for Associate Degree: 73

**8 Mst is required for Bachelor of Electrical Engineering Technology*

STUDENT SHOULD SEE ADVISOR FOR APPROVAL OF ALL ELECTIVES

Bachelor of Engineering Technology

	SEMESTER V					SEMESTER VI			
50 EeT	Linear Systems I	3	0	3	47 EeT	Elect. Inst. & Control	3	3	4
51 EeT	Electronics	3	3	4	60 EeT	Linear Systems II	3	0	3
33 MeT	Thermal Science	3	0	3	61 EeT	Electronics	3	3	4
	Non-Technical Elec. (2)	6	0	6	50 MeT	Statics	3	0	3
						Non-Technical Elective	3	0	3
		15	3	16			15	6	17
	SEMESTER VII					SEMESTER VIII			
70 Eet	Power Systems	3	3	4	84 EeT	Eng'g Management	3	0	3
71 Eet	Digital Systems	3	0	4		Technical Electives (2)	6	0	6
	Technical Elective	3	0	3		Non-Tech. Electives (2)	6	0	6
	Non-Tech. Electives (2)	6	0	6					
		15	3	16			15	0	15

Total Credit Hours Required for Baccalaureate Degree: 137

STUDENT SHOULD SEE ADVISER FOR APPROVAL OF ALL ELECTIVES

Courses in Electrical Engineering Technology (EeT)

11. Basic Electricity—A non-calculus introduction to elementary electric and magnetic concepts, d-c networks and network theorems, and magnetic circuits; including laboratory use of

instruments for making d-c circuit measurements. Prerequisite: 2 MsT concurrent. Rec 2, Comp or Lab 3, Cr 3.

20. Selected Topics in Electrical Engineering Technology—Topics in engineering technology not regularly covered in other courses. The content is varied to suit the needs of individuals. The course may be taken more than once. Prerequisite: consent of instructor. Cr Ar. 1-3 hrs.

21. Basic Circuits—Continuation of 11 EeT, constituting a non-calculus introduction to reactive elements, and continuing into the phasor analysis of single-phase and polyphase a-c circuits in the steady state. Prerequisite: 11 EeT, 4 MsT concurrent. Rec 3, Comp 3, Lab 3, Cr 5.

22. Basic Methods of Technical Computation—Elements of digital computer programming and numerical analysis techniques; applications to electrical engineering technology. Prerequisite: 4 MsT concurrently. Comp 4, Cr 2.

30. Circuits, Machines, and Electronics—Electrical concepts and devices, elementary circuit analysis; fundamentals of AC and DC machinery; principles of electronic devices and circuits. For non-EeT majors. Prerequisite: 7 Pst or corequisite 4 MsT. Rec 3, Comp or Lab 3, Cr 4.

33. Electronics—Basic physical principles of solid state electronic devices. Analysis of rectification, amplification, feedback, and signal generation circuits. Load line analysis and equivalent circuits. Prerequisite: 21 EeT. Rec 3, Comp 3, Lab 3, Cr 5.

34. Engineering Material—Physical and electrical properties of materials used in electrical equipment and electronic devices. Emphasis on electrical insulation, semiconductor materials, and magnetic materials. Rec 3, Cr 3.

35. Electrical Machinery—Theory, performance characteristics and operational control of DC and AC machines. Prerequisite: 21 EeT. Rec 3, Comp 3, Lab 3, Cr 5.

37. Techniques of Electrical Measurement—The theory and operation of both basic and sophisticated measuring devices and equipment. Rec 2, Lab 3, Cr 3.

43. Applied Electronics—Fundaments of communications electronics circuits and systems, emphasizing modulation and detection, transmitters and receivers, transmission lines, multiplexing, and pulse systems. Prerequisite: 33 EeT. Rec 3, Lab 3, Cr 4.

45. Microcomputers, Architecture and Applications—The microcomputer and its component parts including microprocessors, registers, memory and I/O. Programming and applying the microcomputer in engineering systems. Rec 3, Lab 3, Cr 3.

47. Electrical Instrumentation and Control—A study of controllers used for AC and DC motors; the use of silicon controlled rectifiers, analog and digital devices in control of motors. Rec 3, Lab 3, Cr 4.

48. Electrical Projects—Instruction and practice in electronic construction, soldering, printed circuit board layout, and troubleshooting. Lab 6, Cr 2.

50. Linear Systems I—Waveform analysis, voltage current relationships of circuit parameters, basic time domain circuit, circuit analysis by Laplace transforms, system consideration. Prerequisite: 21 EeT, 8 MsT. Rec 3, Cr 3.

51. Electronics—Linear operation of solid-state electronic devices, discrete and integrated; operational amplifiers emphasized. Circuits and systems; applications to engineering technology. Prerequisite: 33 Eet. Rec 3, Comp or Lab 3, Cr 4.

60. Linear Systems II—Introduction to servomechanism theory and practical design, system performance and comparison. Prerequisite: 50 EeT. Rec 3, Cr 3.

61. Electronics—Digital electronics theory and application, emphasizing integrated circuits and their use in computer and other digital systems. Prerequisite: 20 EeT. Rec 3, Lab 3, Cr 4.

70. Power Systems—An introduction to electric power systems, per unit quantities circuit constants, power limits for stability, faults on power systems. Prerequisite: 45 EeT, 47 EeT. Rec 3, Lab 3, Cr 4.

71. Digital Communications Systems—Introductory communications theory and its application to digital data transmission and communications systems. Prerequisite: 43 EeT. Rec 3, Cr 3.

84. Engineering Management—Management techniques in industrial organizations, capitalization and amortization, planning techniques, time value of money. Rec 3, Cr 3.

85. Power Distribution, Illumination and Acoustics—Distribution of electric power to load centers, losses, voltage regulation, power factor correction. General illumination theory; elementary acoustic theory. Prerequisite: 21 EeT. Rec 3, Comp 4 or Lab 3, Cr 4.

MECHANICAL ENGINEERING TECHNOLOGY

The field of mechanical engineering technology includes environmental control, mechanical design, manufacturing processes, heat power and internal combustion engines, and the many technical activities associated with them. The two-year program prepares its graduates for a variety of opportunities as engineering technicians in engineering departments, manufacturing operations and the mechanical service industries.

The curriculum provides training in all four areas of mechanical engineering technology. Classroom instruction in the various subjects is supplemented by extensive training in their practical application in the laboratory and shop.

Students are urged to take technical or industrial employment during the summer between the two years.

Mechanical Engineering Tehnology Curriculum

Associate of Science

	SEMESTER 1	R	L	C		SEMESTER 2	R	L	C
3 Eng	Crit. Written Expr.	3	0	3	8 Pst	Basic Physics	3	0	3
21 GeT	Tech. Drawing	2	3	3	1 ChT	Chemical Tech.	3	3	4
7 MeT	Machine Tool Lab I	1	4	3	26 GeT	Machine Drawing	0	2	1
2 MsT	Algebra & Trig.	3	0	3	4 Eng	Speech	3	0	3
7 PsT	Basic Physics	4	2	5	50 MeT	Statics	3	0	3
					4 MsT	Anal. Geo. & Intro. Cal.	3	0	3
		13	9	17			15	5	17
	SEMESTER 3					SEMESTER 4			
30 EeT	Circuits, Machines & Electronics	3	3	4	6 ARE	Dynamics of Human Behavior	3	0	3
27 GeT	Descriptive Geometry	0	3	2	5 MeT	Heat Treatment	1	2	2
11 MeT	Machine Tool Lab II	0	4	2	34 MeT	Mech. Tech. Lab I	1	4	3
19 MeT	Strength of Materials	3	0	3	36 MeT	Thermal Applications	2	2	3
33 MeT	Thermal Science	3	0	3	61 MeT	Design	2	2	3
6 MsT	Intro. Cal.	3	0	3	70 MeT	Mfg. Tech.	3	3	4
		12	10	17			12	13	18

Bachelor of Engineering Technology

	SEMESTER 5	R	L	C		SEMESTER 6	R	L	C
17 MeT	Dynamics	3	0	3	8 MsT	Intro. Dif. Equations	3	0	3
25 MeT	Fluid Flow Tech.	3	0	3	39 MeT	Power Plant Tech.	3	0	3
31 MeT	Digital Comp.in MeT	3	0	3	40 MeT	Heat Transfer	3	0	3
35 MeT	Mech. Tech. Lab II	1	3	3		Tech. Elective			3
	Hum. Elective			3		Hum. Elective			3
		10	3	15			9	0	15
	SEMESTER 7					SEMESTER 8			
62 MeT	Design II	3	2	4	63 MeT	Design III	0	4	3
71 MeT	Mech. Tech. Lab III	1	3	3	72 MeT	Mech. Tech. Lab. IV	1	3	3
	Tech. Elective			3		Tech. Electives (2)			6
	Hum. Electives (2)			6		Hum. Elective			3
		4	5	16			1	7	15

Technical Electives

Special Topics in Technology
Design Projects
Air Conditioning & Refrigeration
Experimental Stress Analysis

Internal Combustion Engines
Heating & Ventilating

Selected courses from other technical departments (Cet, EeT, Business, and technical courses in the College of Life Sciences and Agriculture BS degree programs, or that College's 2 + 2 Technology degree programs).

Courses in Mechanical Engineering Technology (MeT)

5. Heat Treatment—Modern ferrous metal heat treating operations and the basic principles underlying them. Analysis of the effects of thermal and mechanical operations on microstructure and attendant mechanical properties. Prerequisites: 7 MeT, 19 MeT. Rec 1, Lab 2, Cr 2.

7. Machine Tool Laboratory I—Theory and application of fundamental metal removing processes. Basic metrology and tool nomenclature. Rec 1, Lab 4, Cr 3.

9. Machine Shop and Welding—Fundamental bench work and light machine work using drill presses, lathes, milling machines, shapers and surface grinders. Rec 1, Lab 4, Cr 3.

10. Principles of Production Processes—The function of basic metal working machine tools in diversified manufacturing operations. Applications to maintenance, service, research, and industrial support. Lec and Lab 3, Cr 3.

11. Machine Tool Laboratory II—Design and manufacture of prototype assembly. Application of skill and theory in supervising group projects. Construction and use of production setups. Advanced metrology. Prerequisite: 7 MeT, 26 GeT. Lab 4, Cr 2.

17. Dynamics—The study of kinematics of particles and rigid bodies and the kinetics of particles and rigid bodies, including work and energy, impulse, and momentum. Prerequisite: 50 MeT (or 11 CeT) and 6 MsT. Rec 3, Cr 3.

19. Strength of Materials—Stress and strain in materials and bodies subject to tension, compression, torsion, and flexure. Deflection of prismatic members; columns; combined stresses. Prerequisite: 50 MeT and 4 MsT. Rec 3, Cr 3.

20. Selected Topics in Mechanical Engineering Technology—Topics in engineering technology not regularly covered in other courses. Content is varied to suit the needs of individuals. May be taken more than once. Prerequisite: consent of the instructor. Cr Ar. 1-3 hrs.

25. Fluid Flow Technology—Fluid statics, fluids in motion, flow measuring devices, pumps, compressors, hydraulics and pneumatics, fluid power systems, components and control. Prerequisite: 33 MeT, 36 MeT. Rec 3, Cr 3.

31. Digital Computation in Mechanical Engineering Technology—Computer programming using Fortran language. Applications to mathematical and technical problems. Prerequisite: 6 MsT. Rec 2, Comp 3, Cr 3.

33. Thermal Science—Elementary thermodynamics, fluid mechanics, and heat transfer. Engineering calculations relative to heat, power, work and mechanical and electrical energy. Prerequisite: 8 PsT. Rec 3, Cr 3.

34. Mechanical Technology Laboratory I—Experimental application of solid and fluid mechanics, and thermodynamics. Calibration of laboratory instruments. Prerequisite: 33 MeT and 19 MeT. Rec 3, Lab 4, Cr 3.

35. Mechanical Technology Laboratory II—An introduction to instrumentation, data analysis, and laboratory techniques. Applications to heat power, mechanical processes, and fluid mechanics. Prerequisite: 34 MeT. Rec 1, Lab 3, Cr 3.

36. Thermal Applications—Applications of fundamentals studied in 33 MeT. Steam and gas cycles; analysis of cycle components, steam generators, pumps, turbines, compressors, heat transfer and refrigeration systems. Prerequisite: 33 MeT. Rec 2, Lab 2, Cr 3.

39. Power Plant Technology—Heat power systems including steam, internal combustion engines, turbines, pumps, compressors; in-depth coverage of basic design features, power station technology and economics. Prerequisite: 36 MeT. Rec 3, Cr 3.

40. Heat Transfer—Energy transfer by conduction, convection, and radiation. One- and two-dimensional steady state conduction processes in solids by use of exact solutions, shape factors, and finite differences. Use of charts for certain one-dimensional transients. Electric network method for radiation analysis. Experimental correlations for convection problems. Steady state heat exchanger performance. Prerequisite: 6 MsT and 33 MeT. Rec 3, Cr 3.

50. Statics—The study of forces and rigid bodies in equilibrium, trusses, centroids and centers of gravity, properties of area and friction. Prerequisites: 2 MsT and 7 PsT. Rec 3, Cr 3.

61. Design I—Review of the principles of strength of materials as applied to design. Theories of failure; stress concentration; factors of safety; and design of mechanical assemblies including layout, drafting, and design calculations. Prerequisite: 19 MeT. Rec 2, Lab 2, Cr 3.

62/63. Design II, III—Analysis of mechanical elements. Applications of mechanics of materials, stress concentration, combined stresses, fatigue, and factor of safety to the design of machine components. Prerequisite: 61 MeT and senior standing. Rec 3, Comp 2, Cr 4.

70. Metal Product Manufacturing Technology—Production processes and problems to include: process planning, automation, numerical control, quality analysis, quality control, specialized machine tools and current advances in the field of metal working. Completion and evaluation of prototype assembly. Prerequisite: 11 MeT and senior standing. Rec 3, Lab 3, Cr 4.

71/72. Mechanical Technology Laboratory III,IV—A project-oriented laboratory course in which the student is asked to solve technical problems similar to those encountered by technologists in industry. Prerequisite: 35 MeT. Rec 1, Lab 3, Cr 3.

91. Heating, Ventilating and Air Conditioning—Determination of heating, ventilating and air conditioning loads for buildings and industrial processes. Heat transfer devices and applications to systems. Refrigeration for controlled-temperature applications. Heating, ventilating and air conditioning system layout and control systems. Prerequisite: 36 MeT. Rec 3, Cr 3.

93. Internal Combustion Engines—Application of thermodynamics laws and principles to internal combustion engine cycles, theory of design and operation; fuels and combustion, carburetion, detonation, cooling, and lubrication. Prerequisite: 36 MeT, 25 MeT. Rec 3, Cr 3.

150. Experimental Mechanics—Experimental methods and techniques for analysis of stress, strain, and displacement and their engineering significance. Electric strain gages, brittle lacquers, mechanical and optical strain gages, and introduction to photoelasticity. Prerequisite: 61 MeT. Rec 2, Lab 3, Cr 3.

151. Experimental Mechanics II—Experimental methods and techniques for analysis of stress, strain and motion. Dynamic strain measurement, motion measurement using a reference, Seismic systems, and photoelasticity. Prerequisite: 150 MeT. Rec 2, Lab 2, Cr 3.

Service Courses for the School of Engineering Technology

1 Cht. Introduction to Chemical Technology—A one-semester introduction to the principles of general chemistry most applicable to the laboratory practice of chemical technology. Emphasis will be placed on practical problem solving and laboratory technique. Rec 3, Lab 3, Cr 4.

1/2. GeT. Technical Drawing—Exercises in instrumental drawing, multiview drawing, freehand technical sketching, and lettering. Course 2 introduces instrumental pictorial drawing, threads and fasteners, and working drawings. Lab 4, Cr 2.

21 GeT. Technical Drawing—An introduction to graphic symbols and skills applied to engineering drawings. Topics include: lettering, geometric construction, multiview drawing, sections, graphs, dimensioning, and pictorial drawing. Lec 2, Lab 3, Cr 3.

26 GeT. Machine Drawing—Preparation of complete working drawings of a project for 11 MeT, Machine Tool Lab II. Topics include: design process, dimensioning, tolerancing, fasteners, details, and assembly drawings. Prerequisite: 21 GeT. Lec & Lab 2, Cr 1.

27 GeT. Descriptive Geometry—The solutions of problems of a three-dimensional nature by applying graphical methods. Theoretical and applied problems related to engineering technology. Prerequisite: 21 GeT. Lec & Lab 3, Cr 2.

30 GeT. Construction Drawing—The theory of graphics applied to architectural and structural details, mapping, highways, and fabrication drawings. Prerequisite: 21 GeT. Rec & Lab 4, Cr 2.

2 MsT. Algebra and Trigonometry—Algebra and trigonometry, including numbers, functions, graphs, factoring and fractions, exponents and radicals, logarithms, linear equations, quadratic equations, vectors, and solutions to triangles. Rec 3, Cr 3.

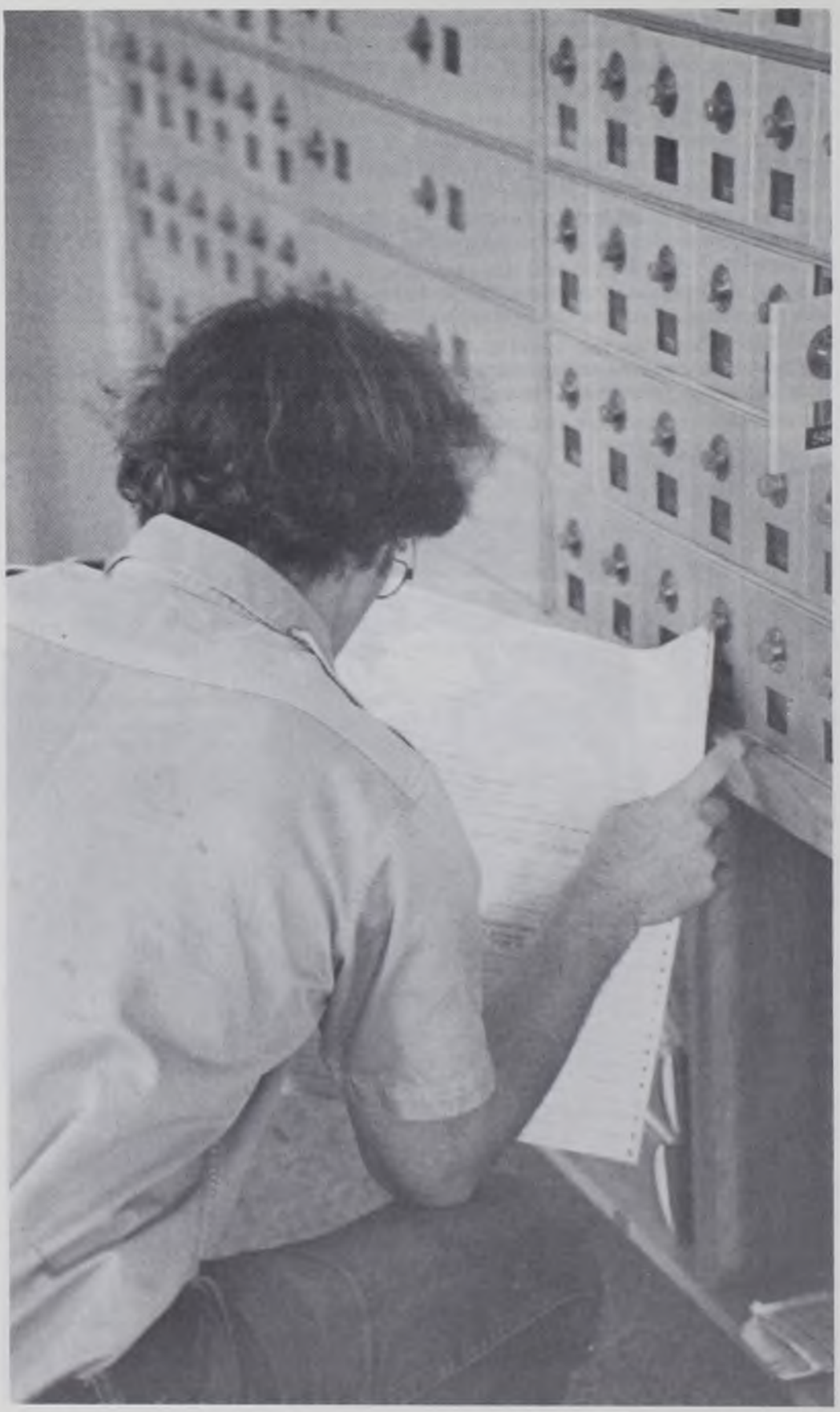
4 MsT. Analytical Geometry and Introductory Calculus—Equations of higher degree, determinants, solutions of inequalities, variation, progression, trigonometric identities and inverse trigonometric functions, elements of analytic geometry and introductory calculus, including straight lines, conic sections, and an introduction to the derivative and its applications. Rec 3, Cr 3. Prerequisite: 2 MsT.

6 MsT. Introductory Calculus—Applications of the derivative, an introduction to integration and its applications, derivatives of transcendental functions and techniques of integration. Rec 3, Cr 3. Prerequisite: 2 MsT, 4 MsT.

8 MsT. Ordinary Differential Equations—An introduction to ordinary differential equations and their applications. A brief introduction to partial differential equations. Rec 3, Cr 3. Prerequisite: 2, 4, 6 MsT.

7 PsT. Basic Physics—An introduction to the basic concepts of mechanics, sound and heat with illustrations taken from technical applications. Calculus is not used. Lec with Dem 2, Rec 2, Lab 2, Cr 5.

8 PsT. Basic Physics—An introduction to the basic concepts of heat, light, and electricity with illustrations taken from technical applications. Prerequisite: 7 PsT. Lec 2, Rec 1, Cr 3.



College of Life Sciences and Agriculture

Kenneth E. Wing, Dean

The College of Life Sciences and Agriculture has contributed richly to the well-being of people in this state and the nation. Graduates around the world carry on the struggle against food and fiber problems, help cope with environmental problems, and seek ways of using, conserving, and restoring our natural resources.

Towards these ends the college offers a continuum of education with programs of study leading to associate, bachelor's, master's, and doctoral degrees. While considerable variation exists in program requirements, all have as common objectives: proficiency in a professional subject-matter field and a broad, liberal education for effective citizenship. This gives the student a fundamental education in the biological, physical, and social sciences as well as courses in the arts and humanities. The central focus is to provide professional education in several different areas leading to attractive career opportunities with private firms and public and private agencies.

The college is composed of two schools: Forest Resources and Human Development and two divisions: Division of Agricultural Science includes the Departments of Agricultural and Resource Economics, Agricultural Engineering, Animal and Veterinary Science, Food Science and Plant and Soil Sciences; Division of Life Sciences includes the Departments of Biochemistry, Botany and Plant Pathology, Entomology, and Microbiology. (Faculty in the Department of Zoology in the College of Arts and Sciences have joint appointments in the college.)The Department of Military Science is administratively associated with the College of Life Sciences and Agriculture. In addition to instruction, each unit carries on research and public service functions. All programs of study fall under one or more of these administrative units. In all programs of study, the college has developed a highly student-oriented counseling system. Each student is assigned a faculty adviser who assists in program planning and career development. In the student-counselor relationship the capabilities, aspirations, and goals of the student are paramount throughout his academic career. Students may select a major or professional area of specializing upon entering college, or they do so at the end of the freshman or sophomore year. The major may be combined with a 'minor' area of study as described on a subsequent page in this section.

DEGREES AND SPECIALIZATIONS

LIFE SCIENCES DIVISION*

Biological Sciences

1. Biology
2. Biochemistry
3. Botany and Plant Pathology
4. Entomology
5. Microbiology
6. (Zoology)-faculty have joint appointments

Forest Resources

7. Forestry
8. Wildlife Management
9. Forest Engineering (Joint with Agricultural Engineering)
10. Wood Science and Technology

Human Development

11. Human Development, with degrees in:
    —Food and Nutrition
    —Child Development Education and Social Service
    —Home Economics Education

—General Home Economics
12. Health and Family Life Education

Natural Resources

13. Natural Resources, with option in Land Use Planning
14. Recreation and Park Management

AGRICULTURAL SCIENCE DIVISION*

15. Agriculture
16. Agricultural Engineering
17. Agricultural Mechanization
18. Forest Engineering (Joint with Forest Resources)
19. Agricultural and Resource Economics, with an option in Sociology of Rural Life
20. Animal and Veterinary Science Options in: Animal Science, Animal Agribusiness, Animal Medical Science and Science Teaching.
21. Plant and Soil Science

In addition, special pre-professional programs in Dairy Technology, and Food Processing are offered as a part of the New England Board of Higher Education plan for regional cooperation. This agreement permits students to complete two-year preparatory programs at the University of Maine at Orono, and to transfer to other specified New England universities for the final two years of professional training. A Pre-Veterinary curriculum is provided for those who wish to qualify for entrance into a regular college of veterinary medicine. Preparation may be gained for admission to dental and medical schools, and for graduate study in marine biology.

*Minor areas of emphasis in baccalaureate degree programs: Biology Education, Botany, Canadian Studies, Computer Science, Entomology, Chemistry, Geology, Mathematics, Plant Science, Soil Science, Food Science, International Agricultural Development, Sociology of Rural Life, Agricultural Sciences, Journalism, and Zoology.

TECHNICAL DIVISION

The college has two-year technical programs that lead to an associate of science degree. The programs are:

1. Agricultural Mechanization Technology (two-plus-two)
2. Animal Agriculture Technology
3. Animal Medical Technology
4. Forest Management Technology
5. Merchandising
6. Plant and Soil Technology (Landscape and Nursery Management)
7. Resource and Business Management, with specialization in
   —Agricultural Business Management
   —Food Industry Management
   —Resource Management

MILITARY SCIENCE

1. Basic courses for freshman and sophomore years
2. Advanced courses for juniors and seniors admitted to the program.

Successful completion leads to commissions in the Army.

ADMISSION REQUIREMENTS

Bachelor of science degree students must submit to the Director of Admissions with the application, scores on the College Entrance Examination Board, Scholastic Aptitude Test (S.A.T.) and the scores on three C.E.E.B. Achievement Tests.

High school course requirements for admission to various professional areas of study are:

A. Animal and Veterinary Sciences, Plant and Soil Sciences, Agricultural and Resource Economics, Agricultural Engineering, Agricultural Mechanization, Biological Sciences, Forest Engineering, Forestry and Wildlife, Natural Resources, and Recreation and Park Management.

English	4 units
Algebra	2 units
Plane Geometry	1 unit
Trigonometry	½ unit (Agricultural and Forest Engineering only)
Science	2 units (Chemistry preferred or Physics)
History of Social Science	1 unit
Electives	5½ to 6 units
Total	16 units

B. School of Human Development:

English	4 units
Mathematics*	2 units (at least 1 of algebra)
Science*	1 unit (Chemistry recommended)
History or Social Science	1 unit
Electives	8 units
Total	16 units

*Algebra I & II, plane geometry, and chemistry required for majors in Food and Nutrition and Health and Family Life Education. Chemistry is required for Home Economics Education.

C. Two-year Associate of Science degree students must have graduated from high school, must complete the C.E.E.B. Scholastic Aptitude Tests, and possess a strong desire for a specific technical program. Two units of mathematics, one of which must be algebra, are required, except for the Forest Management Technology and Agricultural Mechanization programs that requires two units of high school algebra and one unit of geometry. Students who contemplate continuation in a regular four-year baccalaureate degree curriculum must first complete the two-year associate degree program at a grade point average of 2.50 or higher, and must satisfy entrance requirements to the desired baccalaureate degree program.

D. Transfers: Admission of transfer students is made by the University Admissions Office. Evaluation of records for transfer credits is made by the Dean with the aid of the appropriate school director or department chairperson. In general, degree credit is given for equivalent course work passed at a satisfactory level.

GRADUATION REQUIREMENTS

Bachelor of Science Degree Candidates

Completion of course work required in the various programs of the College of Life Sciences and Agriculture leads to a degree of bachelor of science. All students are required to complete a minimum of 120 degree hours, exclusive of credit for basic military training. Exceptions are the School of Forest Resources that requires a 133 credit hours plus 6 credit hours of summer camp and Agricultural Engineering that requires a 130 credit hours.

In addition, each student must accumulate a minimum grade point average of 2.0 and receive a passing grade in all required courses in the program of study.

General subject matter college requirements of all degree candidates are:

		Credit Hours
Communications		
Writing course*	3	
Speaking course**	3	6
Humanities and Social Science	15	
Total		21

*Students selected for Freshman Honors are excused; students may receive degree credit through Advanced Placement or CLEP (College Level Examination Program). All others will ordinarily take Eh 1, College Composition, with possible substitution of Eh 7, Intermediate Composition, and Eh 17, Advanced Professional Exposition, or Jr 31, Functional Writing.

**Students will ordinarily take SC 3, Fundamentals of Public Speaking. Possible substitutes, with permission of College of LSA Dean, are: SC 45, Discussion of Inquiry, SC 47, Debate and Advocacy, or SC 6, Fundamentals of Interpretation.

Associate of Science Degree Candidates

For the degree of associate of science, students must complete satisfactorily a prescribed technical curriculum with a minimum of 64 credit hours earned at an accumulative grade point average of at least 2.0.

COURSES OF INSTRUCTION

Courses numbered 1 to 99 are undergraduate courses. They are open to graduate students but credit earned in these courses may not be used to satisfy advanced degree requirements. Courses numbered 100 to 199 are upperclass, undergraduate courses which may be used for graduate degree credit by graduate students if given prior approval by the graduate student's advisory committee. Courses numbered 200 to 299 are graduate courses which may be elected by undergraduate honor students, or those undergraduates whose advancement in the field will permit their taking a graduate level course among graduate students without disadvantage to themselves. Courses numbered 300 to 399 are graduate level courses which may be taken only by students admitted to the Graduate School.

Courses credited towards the baccalaureate and higher degrees are listed with the departmental abbreviation first, followed by the course number, e.g., Bc 21-Organic Chemistry; courses credited towards the two-year associate degrees are listed with the course number first and the departmental designator second. e.g., 2 Bc-Food Chemistry.

One number is used for a course which is given both fall and spring.

When a dash is used between the two numbers (e.g., 1-2), both semesters must be taken to obtain credit; when a slant is used (1/2), the first semester may be taken by itself, but the second semester cannot be taken unless the first is taken previously; when a period is used (e.g., 1.2), either semester may be taken for credit.

Courses offered in 1981-82 and alternate years are indicated by the sign (‡) placed before the number of the course; courses offered in 1980-81 and alternate years are indicated by the sign (‡) placed before the number of the course.

FRESHMAN PROGRAMS

Students admitted to degree programs of the College of Life Sciences and Agriculture enroll in one of the following freshman programs.

Agriculture

FALL SEMESTER		Hours	SPRING SEMESTER		Hours
LSA 1	Orientation	0	Ch 12/ Bc 8	Gen. Chemistry	4
Ch 11/ Bc 7	Gen. Chemistry	4	Bt 2	Plant Biology	4
Bio 1	Basic Biology	4	or		
Ms 22	Algebra & Trig.	4	Zo 4	Animal Biology	
	Elective	3	En 26	Entomology	4
			Eh 1	English Comp.	3
		15			15

Agricultural and Resource Economics

FALL SEMESTER		Hours	SPRING SEMESTER		Hours
LSA 1	Orientation	0	IDL 24		
Ec 10	Prin. of Economics	3	(ARE, Sy)	Sociology of Rural Life	3
Eh 1	College Composition	3	Sc 3	Fund. of Public Speaking	3
*Ms 13	Math. for Bus. & Econ.	3	Ms 14	Math. for Bus. & Econ.	3
	Basic Science Elective	3(4)		Basic Science Elective	3(4)
	Electives	3		Electives	3
		15(16)			15(16)

*Ms 4 and 26 or Ms 5 and 6 may be substituted.

Agricultural Engineering

FALL SEMESTER		Hours	SPRING SEMESTER		Hours
AE 20	Prin. of Mechanization	3	AE 55	Materials in Ag. Eng.	3
LSA 1	Orientation	0	Ge 2	Intro. to Engrg. Design	2
Ge 1	Intro. to Engrg. Design	2	Ms 27	Anal. Geom. & Cal.	4
Ms 26	Anal. Geom. & Cal.	4	Ps 2	General Physics	4
Ps 1	General Physics	4		Elective	3
	Elective	3			
		16			16

Agricultural Mechanization

FALL SEMESTER		Hours	SPRING SEMESTER		Hours
LSA 1	Orientation	0	Bio 1	Basic Biology	4
Ec 10	Prin. of Economics	3	Ge 2	Intro. to Eng. Design	2
Ge 1	Intro. to Eng. Design	2	Ps 2a	General Physics	4
Eh 1	College Composition	3		Electives	5
Ms 22	Algebra and Trig.	4			
Ps 1a	General Physics	4			
		16			15

Animal and Veterinary Sciences

FALL SEMESTER		Hours	SPRING SEMESTER		Hours
AnV 45	Animal Sciences	3	AnV 63	Career Seminar	1
Ch 11	General Chemistry	4	Eh 1	College Composition	3
LSA 1	Orientation	0	Ch 12	General Chemistry	4
Ms 19, 22, 26 or CS 81	Mathematics*/computer science	4	Zo 4	Animal Biology	4
				Elective (AnV or Ms recommended)	4
Bio 1	Basic Biology	4			
		15			16

*Ms 26 required of students planning on graduate study.

Forest Engineering

FALL SEMESTER		Hours	SPRING SEMESTER		Hours
AE 20	Prin. of Mech.	3	Ae 55	Materials in Ag. Eng.	3
Ec 10	Economics	3	Bio 1	Basic Biology	4
Fy 1	Intro. to Forest Res.	2	Ge 7	Computer Programming	3
Ge 1	Intro. to Design	2	Ms 27	Anal. Geom. & Cal.	4
Ms 26	Anal. Geom. & Cal.	4	Ps 2	Physics	4
Ps 1	Physics	4			
		18			18

Plant and Soil Sciences

FALL SEMESTER		Hours	SPRING SEMESTER		Hours
Bio 1	Basic Biology (Units 1-7, 12)	4.4	Che 12	General Chemistry	4
			Ms 26	Anal. Geom. & Calc.	4
Ch 11	General Chemistry	4	P 22	Crop Management	4
Eh 1	College Composition	3	S 2, S 2L	Soil Science	4
LSA 1	Orientation	0			
P 21	Crop Science	3			
		14.4			16

*Students in the Soils Option substitute Gy 1 Geology for Eh 1 in the fall and Eh 1 for P 22 Crop Management in the spring.

**Ms 22 Algebra and Trigonometry may be necessary for some students in preparation for Ms 26.

Biological Sciences

(Microbiology-Biochemistry-Biology-Botany-Entomology)

FALL SEMESTER		Hours	SPRING SEMESTER		Hours
LSA 1	Orientation	0	Ch 12	Chemistry	4
Ch 11	Chemistry	4	Ms 26	Anal. Geom. & Calc.	4
Eh 1	College Composition	3	Bt 2	Plant Biology	
Bio 1	Basic Biology	4	or Zo 4	Animal Biology	4
Ms 22	Algebra and Trig.	4		Elective	3
		15			15

Forestry and Wildlife

FALL SEMESTER		Hours	SPRING SEMESTER		Hours
Bio 1	Basic Biology	4	Ch 12	Chemistry	4
*Ge 16	Cartographics	3	Ec 10	Economics	
Fy 1	Intro. to Forest		or Sc 3	Public Speaking	3
	Resources	2	Eh 1	College Composition	3
Ms 26**	Anal. Geom. & Calc.	4	Bt 2	Plant Biology	
Ch 11	Chemistry	4	or Zo 4	Animal Biology	4
				Elective	3
		17			17

*Not required of Wildlife majors.
**Ms 22 Algebra and Trigonometry may be necessary for some students in preparation for Ms 26.

Natural Resources

FALL SEMESTER		Hours	SPRING SEMESTER		Hours
LSA 1	Orientation	0	Ch 12	Chemistry	4
Ch 11	Chemistry	4	S 2	Soil Science	3
Eh 1	College Composition	3	S2L	Soil Science Lab	1
Ms 22	Algebra & Trig.	4		Electives	7
Bio 1	Basic Biology	4			
		15			15

Recreation and Park Management

FALL SEMESTER		Hours	SPRING SEMESTER		Hours
LSA	Orientation	0	Ec 10	Prin. of Economics	3
Ch 11	General Chemistry	4	Eh 1	College Composition	3
Ms 22	College Alg. & Trig.	4	S 2	Soil Science	
Bio 1	Basic Biology	4	or S 3	Forest Soil Service	4(3)
Re 69	Foundations of Recr.	3	Zo 4	Animal Biology	4
			Pol 1	American Government	3
		15			17(16)

LIFE SCIENCES DIVISION

BIOCHEMISTRY

Professors Lerner (Chairman), De Haas; Associate Professors Blake, R. Roxby; Part-time Instructors Jacobs, S. Roxby; Lecturers Chase, Chen, Cuprak, LaMarche, O'Callaghan, Sensenig

Biochemistry occupies a central position within the broad field of life sciences. As a discipline, it provides a framework for understanding biology at a molecular level and offers a spectrum of techniques which are becoming critical for the pursuit of biomedical and agricultural research as well as of investigations in many areas of chemistry and physics. The prescribed program offers many career opportunities for the B.S. biochemist and provides a sound background for those continuing on to graduate and professional schools. The B.S. program prepares students for teaching and research in academic positions, for research in government service, and for research and development work in industry. Some of the major areas within biochemistry include the study of the mechanisms of enzyme action, the isolation and purification of macromolecules, the biochemistry of gene function, the mechanisms of metabolic control, the organic chemistry of biological compounds, energetics and energy transformations in biological systems, the mode of action of hormones, vitamins and antibiotics, the physical chemistry and structure of proteins, carbohydrates and nucleic acids, the biochemistry of cell differentiation, development and aging, the biochemistry of microorganisms and fermentation, plant biochemistry, molecular biology, nutrition and physiology of animals and the metabolic basis of diseases.

Courses of study can be developed to fulfill admissions requirements for medical and dental schools. At least 120 degree hours at an accumulative grade-point average of 2.00 are required for graduation.

Curriculum Leading to a Bachelor of Science Degree in Biochemistry

See Freshman Programs Section

Curriculum for Biochemistry Majors

Required Courses		**Credit Hours**	**Minimum Degree Hours Required**
A. BIOCHEMISTRY			22
Bc 161	Princ. of Biochemistry	4	
Bc 162	Advanced Biochemistry	4	
Bc 164	Biochemical Lab Methods	4	
Bc 191, 192	Biochemical Research	6	
	Physical Chemistry Course	4	
B. OTHER BIOLOGICAL AND PHYSICAL SCIENCES			39
Bio 1	Biology	4	
Zo 4	Animal Biology	4	
Mb 127, 128	General Microbiology	5	
Ch 11, 12	Chemistry	4	
Ch 140	Quant. Analysis	4	
Ch 151, 152	Organic Chemistry, Lec.	6	
Ch 161, 162	Organic Chemistry, Lab	4	
Ps 1,2 or 1a,2a	General Physics	8	
C. MATHEMATICS			12
Ms 22	Algebra and Trigonometry	4	
Ms 26	Anal. Geom. and Calculus	4	
Ms 27	Anal. Geom. and Calculus	4	
D. COMMUNICATIONS			8
	Writing	3	
	Speaking	3	
Bc 171, 172	Seminar	2	
E. HUMANITIES AND SOCIAL SCIENCES			15
F. FRESHMAN ORIENTATION			0
H. ELECTIVES			24
Minimum Degree Hours for Graduation			**120**

Courses in Biochemistry (Bc)

7. *Fundamentals of Chemistry*—A review of the essential material from Inorganic Chemistry followed by a study of the types and reactions of organic compounds. Prerequisite: one year of high school chemistry. Rec 3, Lab 2, Cr 4.

8. Elementary Physiological Chemistry—Carbohydrates, lipids, proteins, digestion, enzymes, metabolism, vitamins, hormones, blood and urine. Prerequisite: Bc 7 or the equivalent. Rec 3, Lab 2, Cr 4.

21. Organic Chemistry—Hydrocarbons, alcohol, acids, ketones, aldehydes, esters, amines, and amides. Prerequisites: Ch 11 and 12, Rec 3, Lab 2. Cr 4.

LSA 115. Cooperative Education—Practical experience for the undergraduate student, combining work in a business firm or public agency with academic courses and supervision. Opportunity for student to gain experience, to integrate classroom learning with job performance, and to develop future placement possibilities. Prerequisite: junior standing and permission. Cr 1-16 (Pass/Fail).

122. Biochemistry—H-ion concentration; the properties, digestion, metabolism, and excretion of carbohydrates, fats and proteins; enzymes, vitamins, hormones. Prerequisite: Bc 21. Rec 3, Lab 2, Cr 4.

133. Plant Biochemistry—The biochemistry of photosynthesis, respiration and other metabolic processes in plants. Prerequisite: Bc 21 or Ch 152 or permission. Rec 3, Cr 3.

159. Physical Biochemistry—A study of the fundamental laws, theories, and concepts of physical chemistry and their application to biochemical problems. Prerequisite: Ch 140 and 152, Ps 2 or equivalent, Ms 26 or equivalent. Rec 3, Lab 3, Cr 4.

161. Principles of Biochemistry—Biological, chemical and physical characteristics of essential precursor molecules for metabolic pathways, energy production, cofactors, storage polymers, nucleic acid and proteins. Prerequisite: Ch 152 or permission, Lec 4, Lab 3, Cr 5.

162. Advanced Biochemistry—Essentially a continuation of Bc 161, with emphasis on elements of molecular biology and similar topics. May include discussions of cellular control mechanisms, virus structure, enzyme kinetics, at the discretion of the instructor. Prerequisite: Bc 161 or permission. Lec 3, Cr 3.

164. Biochemical Laboratory Methods—Chromatography, electrophoresis, enzymes, natural products, and other procedures employed in biological research. Prerequisite: Bc 161 or instructor's permission. Lab 8, Cr 4.

171.172.Seminar—Preparation and presentation of papers dealing with current research in the field of biochemistry. Cr 1.

191.192. Biochemical Research—Problems in biological or agricultural chemistry. A comprehensive report is required. Seniors and graduate students only. Cr Ar.

201. Molecular Biology—Gene function at the molecular level. Biological, chemical and physical properties and structure-function relationships of the informational macromolecules. Prerequisites: Bc 161 or permission. Lec 3, Cr 3.

‡*220. Carbohydrates and Lipids*—The chemistry and metabolism of carbohydrates and lipids with emphasis on control mechanisms which govern anabolic and catabolic pathways. Prerequisite: Bc 161 or permission. Lec 3, Cr 3.

‡*225. Proteins and Enzymes*—Emphasis is on contemporary principles of protein structure and interactions, enzymes, and catalysis, and membrane function. Prerequisite: Bc 162 or permission. Rec 3, Cr 3.

‡*230. Vitamins and Hormones*—The chemistry and biological roles in metabolic processes of the regulators of living systems. A comprehensive review of the classical and current knowledge of the metabolic functions of vitamins and hormones. Prerequisite: Bc 162 or permission. Rec 3, Cr 3.

‡*242. Biochemical Mechanisms*—Metabolic regulatory mechanisms. Cooperatively and feedback control; induction, repression and control of protein synthesis; regulation of membrane transport and energy metabolism. Prerequisite: Bc 159 or equivalent and Bc 161 or equivalent or permission.

272. Graduate Seminar—Cr 1.

399. Graduate Thesis—Cr Ar.

BIOLOGY

Coordinators: Professors Gelinas, Botany and Plant Pathology; and Roberts, Zoology

The curriculum in Biology is an interdepartmental offering administered by a committee representing the Departments of Biochemistry, Botany, Entomology, and Microbiology in the College of Life Science and Agriculture and the Department of Zoology in the College of Arts and Sciences. Two options are available: the student can earn a B.A. degree by meeting the Arts and Sciences requirements.

The Biology Program permits a student to gain a broad background in the biological sciences. The curriculum offers several program choices leading to career opportunities such as high school teacher, ecologist, food scientist, agricultural scientist, naturalist, etc. The curriculum is suitable for students wishing the broad basic education required in preparation for graduate study which leads to careers in government, industry, and teaching and research at the university level. Other students can prepare for admission to professional schools of medicine, dentistry, optometry, pharmacy, and other advanced study such as marine biology. For some, a broad education is desired rather than a specific career-orientated program.

All students will take a common freshman program. Students should consult their academic advisers for particular vocational requirements.

CURRICULUM IN BIOLOGY
(Core Curriculum)

	Credit hours	Minimum degree hours required
A. Biological and Physical Sciences		
1. Required:		**59-60**
Ch 11-12 or 13-14 Chemistry	8	
Ms 22, Ms 26 Mathematics	8	
Ps 1a-2a Physics	8	
Bio 1 Basic Biology	4	
Bt 2 Plant Kingdom	4	
Zo 4 Animal Kingdom	4	
En 26 Entomology	4	
Mb 127 Microbiology	3	
Mb 128 Microbiology Lab	2	
Zo 162 Genetics	4	
Zo 165 Evolution	3	
Bc 122-122L, or Bc 133-122L, or Bc 161-161L Biochemistry	4-5	
IDL 119 Ecology	3	
2. Group Requirements:		
Chemistry		16-22
Bc 21 Organic Chemistry or Ch 151-161 Organic Chemistry	4	
Ch 151-161 Organic Chemistry and Ch 152-162 Organic Chemistry	10	
Taxonomy		
Mb 136, Bt 159, 164, 173, En 140, 153 Zo 131, 153, 158	4	
Physiology		
Bt 153, Mb 153, Zo 177	4	
Anatomy		
Bt 135, Zo 133, 136	4	
B. Communications		
Written	3	
C. Humanities and Social Sciences		15
D. Orientation		
E. Special requirements and options		20-27

B.A. DEGREE IN COLLEGE OF ARTS AND SCIENCES*

a. Upper level courses (Combined with Humanities and Social Sciences in "C" above for a total of 27 hours—minimum of 12 hours in the 27 must be upper level courses) Must include 11 hours of Humanities, with Foreign Language through intermediate level, and 11 hours of Social Sciences	12	
b. Free electives		8-15

B.S. DEGREE IN COLLEGE OF LIFE SCIENCES AND AGRICULTURE

a. Communications		3
Oral (Sc 3, LSA requirement)	3	
b. Biology or related upper level electives		12-15
Students wishing to do so may use these hours to meet requirements for one of the following optional minors (15 credit hours each)		
— Agricultural Sciences		
— Biology Education		
— Botany		
— Canadian Studies		
— Computer Science		
— Chemistry		
— Entomology		
— Geology		
— Journalism		
— Mathematics		
— Food and Nutrition		
— Food Science		
— Plant and Soil Sciences		
— Sociology of Rural Life		
c. Free Electives		2-12
TOTAL		120 hours

*See College introduction for more detailed description of requirements and options.

Courses in Biology (Bio)

1. Basic Biology—An introduction to fundamental principles of structure and function in living systems, both plants and animals. Open to students of all colleges. Lec 3, Lab 2, Cr 4.

60. Interactions Between Man and Environment—The interrelationships between man and the rest of the nature, with consideration of human population growth, natural resources, population and degradation of the biosphere. Environmental problems are examined in the light of ecological ideas and principles. No freshmen. Rec 3, Cr 3.

LSA 115. Cooperative Education—Practical experience for the undergraduates student, combining work in a business firm or public agency with academic courses and supervision. Opportunity for student to gain experience, to integrate classroom learning with job performance, and to develop future placement possibilities. Prerequisite: junior standing and permission. Cr 1-16 (Pass/Fail).

151. Interpretation of Biological Statistics—A beginning course in univariate statistics dealing with parametric and nonparametric tests. Much emphasis on the interpretation of results and application of techniques to biological literature. Prerequisite: Ms 22 and Bio 1. Cr 3.

168. Limnology—The ecology of inland waters, with emphasis on the physical, chemical and biological characteristics of lakes. Prerequisite: Zo 4 and Bt 2, Ch 12; IDL 119 recomm. Lec 3, Cr 3.

168L Limnology Lab and Field—Laboratory and field studies emphasizing chemistry and biology of lakes. Saturday field trips. Prerequisite: Bio 168 or concurrent. Lab 4, Cr 2.

213. Biological Literature—Use of library indexes to the biological literature and research journals. Manuscript preparation for scientific publication. For beginning graduate students as an aid in library use, literature search, thesis preparation, and publication. Prerequisite: permission. Cr 2.

BOTANY AND PLANT PATHOLOGY

Associate Professor Gelinas (Chairman), Professors Campana, Cooper, Davis, Manzer, Richards, Vadas; Associate Professors Homola, Laber, Neubauer; Assistant Professors Caruso, Jacobson, Tavantzis, Waddell; Faculty Associates Leach, Shigo; Emeritus Professors, Hyland, McCrum.

The curriculum leading to the B.S. in Botany is designed for students preparing for careers in teaching, research, and a wide variety of other fields where a knowledge of plant structure and function is important. Students successfully completing degree requirements in botany will be well qualified to enter graduate programs leading to advanced degrees in botany and other biological sciences.

Curriculum for BS in Botany

	Credit Hours	Minimum Degree Hours Required
Required Courses		
A. COMMUNICATIONS		9
Eh 1 College Composition	3	
Eh 17 Adv Profession Exposition	3	
SC 3 Fund of Public Speaking	3	
B. HUMANITIES AND SOCIAL SCIENCES		15
Two courses in a foreign language are strongly recommended.		
C. MATHEMATICS		4
*Ms 26 Analytic Geometry & Calculus	4	
Recommended elective, Ms 18 or 19 Statistics		
*Ms 22 may be required as a prerequisite to Ms 26.		
D. CHEMISTRY		12
Ch 11,12 or Ch 13,14 General Chemistry	8	3
Bc 21 Organic Chemistry		
or		
Ch 151,152 Organic Chemistry	4(5)	
(Recommended for students concentrating in physiology).		
E. PHYSICS		8
Ps la.2a General Physics	8	
F. SOIL SCIENCE		4
S 2 Soil Science	4	
G. BIOLOGICAL SCIENCES		20
Bio 1 Basic Biology	4	
IDL 119 General Ecology	3	
Mb 127.128 General Microbiology	5	
Zo 4 Animal Biology	4	
Zo 162 Principles of Genetics	4	
H. BOTANY		24
Bt 2 The Plant Kingdom	4	
Bt 47.48 Problems in Botany	2	
Bt 135 Plant Anatomy	4	
Bt 153.153a Plant Physiology	4	
Bt 154 Intermediate Plant Physiology	4	
Bt 161.162 Seminar	2	
Bt 164 Taxonomy of Vascular Plants	4	
I. FREE ELECTIVES*		24

J. FRESHMAN ORIENTATION	0
MINIMUM DEGREE HOURS REQUIRED FOR GRADUATION	120

*Suggested Areas of Emphasis:

Ecology:

Ms 18 or Ms 19, Bc 133, Bio 168, Fy 128, IDL 120, IDL 175, Zo 165, Zo 186, Oc 170, and Bt 263.

Physiology:

Bt 156, Bc 133, Mb 153, Zo 177, and Bt 258.

Natural Science:

Bt 33, Bt 156, Bt 157, Bt 158, Bt 159, Bt 173, Bt 174, Bt 260, and Bt 262.

Courses in Botany (Bt)

Bio 1. Basic Biology—An introduction to fundamental principles of structure and function in living systems, both plants and animals. Open to students of all colleges. Lec 3, Lab 2, Cr 4.

2. The Plant Kingdom—The morphology, reproduction, ecology and phylogenetic significance of the major classes of the plant kingdom. Open to students of all colleges. Lec 3, Lab 2, Cr 4.

33. Dendrology—Classroom and field work on identification and classification of trees and native shrubs of North America. Prerequisite: Bio 1, Lec 2, Rec 1, Lab 2, Cr 4.

47.48. Problems in Botany—Open to juniors and seniors who have special interest and qualifications in botany. Cr Ar.

Bio 60. Interactions Between Man and Environment—The interrelationships between man and the rest of the nature, with consideration of natural resources, population, and degradation of the biosphere. Environmental problems are examined in the light of ecological ideas and principles. No freshmen. Rec 3, Cr 3.

LSA 115. Cooperative Education—Practical experience for the undergraduate student, combining work in a business firm or public agency with academic courses and supervision. Opportunity for student to gain experience, to integrate classroom learning with job performance, and to develop future placement possibilities. Prerequisite: junior standing and permission. Cr 1-16 (Pass/Fail).

IDL 119. General Ecology—A course in ecological principles for the science major. Major topics include environmental factors, population ecology, community ecology and ecosystem energetics. Prerequisites: one year of college chemistry; one year of college biological science. Lec 3, Cr 3.

IDL 120. Ecology Laboratory and Field Course—Ecosystems studied in the field, and ecologic experimentation in the laboratory, to illustrate ecologic principles and provide technical experience. Saturday field trips. Prerequisites: IDL 119 and a course in statistics (may be concurrent). Lab and field 6, Cr 3.

135. Plant Anatomy—The origin, development, and structure of tissue systems of vegetables and reproductive organs of vascular plants. Prerequisite: Bio 1, Lec 2, Rec 1, Lab 2, Cr 4.

IDL 140. Seminar in Quaternary Studies—Physical, biological and anthropological studies related to the Quaternary Period. Subjects vary each semester. May be taken more than once for credit. Prerequisite: permission. Cr 2.

150. Botanical Microtechnique—Methods of killing, embedding, sectioning, and staining plant material. Methods of studying and recording microscopic preparation. Prerequisite: Bt 2 or Zo 4. Lec 2, Lab 4, Cr 4.

153. Plant Physiology—Physiological processes in plants, with emphasis on water relations, mineral nutrition and physiological ecology. Prerequisite: Bio 1 and one year of chemistry. Lec 3, Lab 2, Cr 3.

153L. Plant Physiology Laboratory—Laboratory study of the physiological function of the higher plants. Prerequisite or corequisite: Bt 153. Lab 2, Cr 1.

154. Intermediate Plant Physiology—Physiological and biochemical aspects of plant metabolism, growth and development. Laboratory methods for physiological studies on intact plants, isolated organelles and enzymes. Prerequisite: Bt 153, Organic Chemistry or permission of the instructor. Lec 2, Lab 4, Cr 4.

156. Forest Pathology—Principles of plant disease. Open to juniors and seniors. Prerequisites: Bio 1. Lec 2, Rec 1, Lab 2, Cr 4.

157. Plant Pathology—Principles of plant disease. Open to juniors and seniors. Prerequisite: Bio 1. Lec 2, Rec 1, Lab 2, Cr 4.

†*158. Bryology*—Identification and classification of liverworts and mosses. Prerequisite: Bt 2 or an equivalent with the permission of the instructor. Lec 1, Rec 1, Lab 2, Cr 3.

159. General Mycology—Comparative morphology, classification and identification of fungi plus investigation of unusual hereditary and physiological characteristics. Prerequisite: Bio 1, Lec 2, Lab 4, Cr 4.

161.162. Seminar—Literature reviews of topics selected from current botanical research, Lec 1, Cr 1.

164. Taxonomy of Vascular Plants—Identification and classification of flowering plants. Prerequisite: Bio 1, Lec 2, Lab 4, Cr 4.

Bio 168. Limnology—The ecology of inland waters, with emphasis of the physical, chemical and biological characteristics of lakes. Prerequisite: Zo 4 and Bt 2, Ch 12; IDL 119 recommended. Lec 3, Cr 3.

Bio 168L. Limnology Lab and Field—Laboratory and field studies emphasizing chemistry and biology of lakes. Saturday field trips, Prerequisite: Bio 168 (or concurrently). Lab 4, Cr 2.

173. Biology of Algae—Comparative morphology and reproduction, identification and classification of algae. Laboratory and field work emphasize studies on living material and include techniques on algal culture, sexuality, microtechnique and preservation. Prerequisites: Bio 1 and Bt 2 or permission. Lec 2, Lab 4, Cr 4.

‡*174. Aquatic Flowering Plants*—Identification, classification and ecology of marsh and aquatic flowering plants. Prerequisite: Bt 164 or permission. Lec 1, Lab 2, Cr 2.

IDL 239. Ice Ages and Mankind—Introduction to the physical, biological, and human environments of the Quaternary Period (roughly the past 1.5 million years), with greatest emphasis on the paleoecology and prehistoric archaeology of the past 20,000 years. Special attention to productive research approaches in the various fields of Quaternary studies, and to important recent advances. Prerequisite: introductory courses in geology, ecology, and anthropology and/or permission of instructor. Lec 3, Cr 3.

IDL 245. Late Quaternary Paleoecology—Ecology of the recent geologic past; effects of changing environments on the distribution, migrations and extinctions of marine inland-aquatic and terrestrial biota. Historical view of organism interaction, including role of man. Laboratory and field studies emphasize late and postglacial changes, and include analyses of the pollen and plankton microfossil content of Maine lake sediments. Prerequisite: permission, a course in ecology and a year of chemistry; plant taxonomy and quaternary geology; limnology and oceanography recommended. Lec 2, Lab and Lec 5, at least two all-day field trips. Cr 4.

256. Physiology of Plant Disease—Advanced study of plant disease with emphasis on the physiology of parasitism and microbial interaction. Prerequisite: Bt 153 and Bt 156. Lec 2 or Bt 157. Cr 3.

257. Plant Virology—Provides the student with a working knowledge of the techniques used in the study of plant viruses, the structure and organization of plant viruses and how this relates to their role as pathogens, the biology, epidemiology, and control of plant virus diseases. Prerequisite: Bc 161 or permission of instructor. Lec 1, Lab 6, Cr 4.

‡*258. Advanced Plant Physiology*—Advanced study of the physiology of plants, including photosynthesis, mineral nutrition, growth regulators, water relations, and respiration. Prerequisite: Bt 153. Lec 2, Lab 4, Cr 4.

260. Comparative Morphology of Vascular Plants—Basic concepts on the origin and development of vascular plants, their morphology, anatomy, homologies and interrelationships. Prerequisite: Bt 135 or equivalent and permission. Lec 2, Lab 4, Cr 4. (Offered 1979-80).

262. Plant Geography—The distribution of plants on the earth with emphasis on the causes of distributional phenomena. Field trips will be arranged. Prerequisite: Bt 164. Lec 3, Cr 3. (Offered 1979-80).

268. Advanced Plant Ecology— Classical and modern perspectives on vegetation ecology, including floristic and ecosystem approaches; classification and ordination of vegetation data. Dynamics of vegetation with emphasis on the role of disturbance in landscape development; paleoecological perspectives. Aspects of plant population ecology. Prerequisite: IDL 119 or equivalent, one year calculus. Lec 2, Lab 4, plus two field trips. Cr 4.

IDL 263. Marine Benthic Ecology—Advanced course emphasizing ecological studies on benthic intertidal and subtidal marine organisms. Discussions on limiting factors, distributions, zonation, biotic interactions, food webs, succession, productivity, community structure and species diversity. Prerequisite: a course in ecology. Lec 2, Rec 1, Cr 3.

271.272. Seminar—Literature reviews. Techniques, procedures and results in botanical research. Cr 1.

301. Research Methods in Plant Science—Laboratory, greenhouse, and field techniques involved in botanical research. Prerequisite: Bt 153 or Bt 156 and permission of instructor. Cr Ar.

307.308. Problems in Botany—Independent research not a part of thesis preparation. Cr Ar.

IDL 340. Seminar in Ecology—An interdisciplinary seminar concerning both the theoretical aspects and application of ecological principles. Prerequisite: permission of instructor.

399. Graduate Thesis—Cr Ar.

Courses Offered Periodically

IDL 175. Field Studies in Ecology—A field trip of one to several weeks to an area of ecologic interest; details announced in time for registration each year course is offered. Trips may be scheduled during Christmas, midyear, spring recess or summer. An intensive ecology field course; field and living conditions will often be rigorous and/or primitive. Prerequisite: a course in ecology. Other preparation and/or recommended prerequisites announced for each trip. Credit will differ, depending upon trip.

264. Photosynthesis and Chloroplast Development—The physiology and biochemistry of photosynthesis. Chloroplast structure and development, chlorophyll synthesis, photolysis of H_2O, electron transport, photophosphorylation, the path of carbon in photosynthesis, photorespiration, and plant productivity. Prerequisite: Bc 122 and Bt 153, or permission of instructor. Lec 2, Rec 1, Cr 3.

299. Lake Ecology and Productivity—Functional aspects of lake ecosystems, including productivity, trophic dynamics, succession (incl. paleolimnology) and eutrophication; an advanced course for students already familiar with basic ecologic principles. Prerequistes: a course in ecology (Zo. 168 Limnology desirable but not essential); Ch 13/14 or equivalent; or permission of the instructor. Lec 1, Lab 4, Cr 3.

Courses Offered in Summer Session and CED Only

110. The Plant World—For elementary and secondary school teachers. The role of plants in the economy of man. Origin, classification, structure and development, function, modification, environment and distribution of plants. Laboratory work in plant collection, identification and preservation. Techniques in methods of preparation of material for study, exhibits and displays. Additional requirements will be stipulated for graduate credit. (Limited to 24 students). Lec 3, Cr 3.

ENTOMOLOGY

Professors Forsythe (Chairman), Dimond, D. Leonard, Olson, Osgood, Storch; Associate Professor McDaniel; Assistant Professor K. E. Gibbs; Cooperating Assistant Professor Houseweart; Faculty Associate Jennings; Lecturer Brower; Emeritus Professors Dirks, Simpson

The Entomology curriculum is designed to provide training for various positions in government and industry or to lay a firm basis for further training at the graduate level, leading to teaching or extension positions in colleges or to research positions in experiment stations or in industry.

Students with sufficient background and interest will be encouraged to enter graduate school for further specialization. Such students are encouraged to elect foreign languages as undergraduates.

The Department of Entomology offers a master of science degree. A doctor of philosophy in Plant Sciences, Forest Resources or Zoology may be taken by Zoology majors.

Curriculum Leading to a Bachelor of Science Degree in Entomology

		Degree Hours	Minimum Degree Hours Required
Required Courses			
A. ENTOMOLOGY			15
En 26	Introductory Entomology	4	
En 140	Insect Biology & Taxonomy	4	
En 153	Biology & Taxonomy of Advanced Orders	4	
En 149	Economic Entomology	3	
B. OTHER BIOLOGICAL SCIENCES			40
Bio 1	Basic Biology	4	
Bt 2	Plant Kingdom	4	
Bt 164	Taxonomy of Vascular Plants	4	
Mb 127-128	General Microbiology	5	
Bc 21 and 122	Biochemistry	8	
Zo 4	Animal Biology	4	
Zo 153	Invertebrate Zoology	4	
Zo 158	Parasitology	4	
Zo 162	Genetics	3	
C. PHYSICAL SCIENCES			16
Ch 11-12	Chemistry	8	
Ps 1a-2a	General Physics	8	
D. MATHEMATICS			8
Ms 22	Algebra and Trigonometry	4	
Ms 26	Analytic Geometry and Calculus	4	
E. COMMUNICATIONS			6
Eh 1	College Composition	3	
Sc 3	Speech	3	
F. HUMANITIES AND SOCIAL SCIENCES			15
	Recommended foreign language, French, German or Russian—at least 8 hours of any one— may be used as a humanity.		
G. FRESHMAN ORIENTATION			0
H. ELECTIVES: Suggested courses in ecology and in statistics.			20
Minimum Degree Hours Required for Graduation			**120**

Courses in Entomology (En)

26. Introductory Entomology—Fundamental principles of insect life and the relation of insects to plants, animals, and man. En 26L to be taken concurrently. Prerequisite: Bio 1, Rec 2, Cr 2.

26L. Introductory Entomology Laboratory—A study of structure, physiology, ecology, and systematics. An insect collection is required. Students may wish to start their collections before taking the course. To be taken concurrently. Prerequisite: To be taken concurrently with En 26. Lab 4, Cr 2.

27. Introductory Entomology for Foresters—Principles of insect life with emphasis in lectures on technical aspects of interest to professional foresters. Offered in the spring semester only. En 27L to be taken concurrently. Prerequisite: Bio 1. Rec 2, Cr 2.

27L. Introductory Entomology Laboratory for Foresters—A study of insect structure, physiology, ecology, and systematics. To be taken concurrently with En 27. Lab 2, Cr 1.

47.48. Problems in Entomology—Open to juniors and seniors in any college who have special interest and qualifications in entomology. Cr Ar.

LSA 115. Cooperative Education—Practical experience for the undergraduate student, combining work in a business firm or public agency with academic courses and supervision. Opportunity for student to gain experience, to integrate classroom learning with job performance, and to develop future placement possibilities. Prerequisite: junior standing and permission. Cr 1-16 (Pass/Fail).

140. Insect Biology and Taxonomy—Introduction to the orders and families of insects: their characteristics, evolution, biology, and systematics. Laboratory emphasis is on identification of lower orders and Coleoptera. Prerequisite: En 26 or 27. Rec 2, Lab 4, Cr 4.

143. Forest Insect Ecology—Study of the physical and biotic environmental components which regulate the distribution and abundance of insects. Forest insects are used to illustrate ecological principles. Prerequisite: En 26 or 27. Rec 2, Lab2, Cr 3.

‡*149. Economic Entomology*—The basic principles involved in applied control of insects. Biological, chemical, and newer types of control methods and their ecological implications. Legislation related to use of chemicals. Laboratory includes independent study, demonstrations, and selected readings of special topics. Prerequisite: En 26 or 27. Rec 2, Lab 2, Cr 3.

‡*153. Biology and Taxonomy of Advanced Orders*—Characteristics, biology, and systematics of Lepidoptera, Diptera, and Hymenoptera. Laboratory deals exclusively with the identification of native and exotic specimens within those three orders. Prerequisite: En 26 or 27. Rec 2, Lab 4, Cr 4.

205.206. Problems in Entomology—Cr Ar.

‡*211. Insect Ecology*—The ecology effects of biotic and abiotic factors on insects and on insect population ecology. Outside reading, field trips, and an independent laboratory study required. Prerequisite: beginning course in ecology, and some background in statistics, physiology, and entomology or permission of instructor. Rec 3, Lab 3, Cr 4.

‡*214. Medical Entomology*—Training in recognition, classification, life cycles, habits and control of insects and near relatives that cause disease or function as vectors of pathogens. Prerequisite: En 26 or 27 and Zo 158 or permission of instructor. Rec 2, Lab 2, Cr 3.

‡*230. Aquatic Entomology*—Aquatic stages of freshwater insects including distribution, biology, ecology and adaptions. Roles as food sources for fish and waterfowl and indicators of water quality emphasized. Laboratory and field studies emphasize identification and sampling methods. Prerequisite: En 26 or 27, or permission of instructor. Lec 2, Lab 4, Cr 4.

‡*251. Morphology of Insects*—External and internal anatomy of insects. Laboratory includes gross dissections of internal organs of representative insects. Prerequisite: En 26 or 27. Rec 2, Lab 4, Cr 4.

261.262. Seminar—Review of entomological literature on assigned topics and its presentation. The subject area of seminar will vary each semester. The course may be taken more than once for credit. Rec 1, Cr 1.

‡*314. Behavior of Arthropods*—Anatomy and physiology of the nervous system, especially sensory receptors. Basic patterns of orientation to extrinsic stimuli. Significance of behavorial patterns to the survival of individuals and populations. Prerequisite: permission. Rec 2, Lab 2, Cr 3.

399. Graduate Thesis—Cr Ar.

MICROBIOLOGY

Professors Nicholson (chairman), Pratt, Bain, Buck, Gershman; Associate Professors DeSiervo; Assistant Professor Jerkofsky; Lecturer Waymouth

The Microbiology curriculum is designed to give students a thorough knowledge of biological principles while providing skills needed to study microorganisms and tissue culture.

Students with interest in microbiology are prepared for wide variety of positions in industry, government, and public health laboratories. With proper selection of electives a student can satisfy requirements to all medical and dental schools.

Students who are well qualified and interested are encouraged to pursue graduate work for further specialization. The Department of Microbiology offers a master of science degree; a doctor of philosophy degree can be earned in a cooperating program.

Requirements for a B.S. degree are satisfactory completion of at least 120 degree hours at an accumulated grade-point average of not less than 2.0 in a course of study that conforms to the following curriculum.

Curriculum for Microbiology Majors

See Freshman Programs Section

Required Courses		Credit Hours	Minimum Degree Hours Required
A. MICROBIOLOGY			22
Mb 127	General Microbiology	3	
Mb 128	General Microbiology Lab	2	
Mb 136, 136L	Determinative Bacteriology	4	
Mb 152, 152L	Pathogenic Bacteriology and Serology	4	
Mb 153, 153L	Bacterial Physiology	4	
Mb 176, 176L	Viorlogy	4	
Mb 187	Seminar	1	
B. PHYSICAL SCIENCES			20
Ch 11, 12	General Chemistry	8	
Ch 140	Quantitative Analysis	4	
Ps 1a, Ps 2a	General Physics	8	
C. BIOLOGICAL SCIENCE			8
Bio 1	Basic Biology	4	
Zo 4	Animal Biology	4	
D. ORGANIC CHEMISTRY AND BIOCHEMISTRY			8-15
Bc 21, 21L	Organic Chemistry	4	
Bc 122, 122L	Biochemistry	4	
or			
Ch 151-152	Organic Chemistry Lec	6	
Ch 161-162	Organic Chemistry Lab	4	
Bc 161, 161L	Advanced Biochemistry	5	
E. MATHEMATICS			7
Ms 26	Anal. Geom. & Calculus	4	
Cs 81	Computer Programming	3	
F. COMMUNICATION			6
Eh 1	College Composition	3	
SC 3	Fund. of Public Speaking	3	
G. HUMANITIES AND SOCIAL SCIENCES			15
PI 3	Methods of Reasoning	3	
	Elective	12	
H. FRESHMAN ORIENTATION			0
I. FREE ELECTIVES		27-34	
Minimum Degree Hours for Graduation			**120**

Courses in Microbiology (Mb)

21a. Elementary Microbiology Laboratory—A laboratory and demonstration course. Microscopy, cultivation, biochemical activities and control of microorganisms. Prerequisite: or corequisite: Mb 127. Cr 1.

LSA 115. Cooperative Education—Practical experience for the undergraduate student, combing work in a business firm or public agency with academic courses and supervision. Opportunity for student to gain experience, to integrate classroom learning with job performance, and to develop future placement possibilities. Prerequisitie: junior standing and permission. Cr 1-16 (Pass/Fail)

122. Microbiology and Man—Basic principles of bacteriology and their application to agriculture, industry, sanitation, public health and disease. Student participation in techniques dealing with laboratory procedures. CED only. Rec 3, Cr 3.

127. General Microbiology—A basic biology course dealing with general principles as illustrated by microorganisms, in particular, bacteria and viruses. Cell structure, cell metabolism, genetics, geochemical activities, and host-parasite relations. Rec 3, Cr 3.

128. General Microbiology Laboratory—A laboratory study of the properties of bacteria and related microorganisms. Techniques and identification. Suggested for students majoring in sciences. Prerequisite or corequisite: Mb 127. Lab 4, Cr 2.

130. Fundamentals of Public Health—General consideration of the relationship between the health of the individual and environment. Prerequisite: Mb 127. Rec 2, Cr 2.

136. Determinative Bacteriology—Morphological, cultural and physiological characteristics of important bacterial groups. Isolation and classification or organisms in our environment.Prerequisite: Mb 127, Mb 128. Rec 2, Lab 4, Cr 4.

IDL 138. Food Microbiology—Importance of microorganisms in food processing, spoilage, and preservation. Role of microorganisms in fermentation and production of protein, enzymes, and other products. Food as vehicle of infection and intoxication. Cr 3.

152. Pathogenic Bacteriology and Serology—The relationships and characteristics of microorganisms that cause disease in man and animals and the response of the latter to the invasion of the parasite. Prerequisite: Mb 127, Mb 128. Rec 2, Lab 4, Cr 4.

153. Bacterial Physiology—The properties and behavior of bacteria with respect to their chemical and physical requirements for life and reproduction. Prerequisite: Mb 127, Bc 122.Rec 2, Lab 4, Cr 4.

176. Virology—An introductory course in the study of viruses, emphasizing their nature, methods of cultivation, mode of transmission, and classification. Prerequisite: Mb 152 or permission of instructor. Rec 2, Lab 4, Cr 4.

187.188. Seminar—Preparation and presentation of papers dealing with current research and developments in the field of bacteriology. Cr 1.

191.192. Independent Study—A laboratory and conference for students desiring to pursue some particular line of investigation. Prerequisite: permission of instructor. Cr Ar.

201. Marine Bacteriology—The properties and distribution of bacteria in the marine environment. Their role in the cycle of elements in the sea. Parallels with aquatic and soil microbiology will be drawn. Prerequisites: General Microbiology and General Chemistry. Rec 3, Cr 3.

231. Microbial Genetics—The genetics of bacteria and viruses dealing with mutation, transformation, transduction, recombination, and gene control mechanisms. Microbial techniques of genetic mapping and fine structure determination will be described. Prerequisite: General Microbiology and Organic Chemistry. Lec 3, Cr 3.

275. Cell Culture—Cell culture techniques especially designed to acquaint the student with methods of growing tissue cells from various sources and the practical application. Prerequisite: Mb 128 or Bt 156. Rec 2, Lab 4, Cr 4.

276. Advanced Topics in Animal Virology—Indepth consideration of selected topics in animal virology related to viral structure, virus cell interactions, virus replication, and viral oncogenesis. Emphasis will be placed on topics of current significance. Prerequisite: Mb 176 or permission of instructor. Rec 3, Cr 3.

280. Immunology—The immune response with particular emphasis on the structure of antigens and antibodies; the synthesis of antibody molecules; and the nature and significance of antigen-antibody reactions. Prerequisites: General Microbiology and Organic Chemistry. Rec 3, Cr 3.

282. Immunology Laboratory—A laboratory course to familiarize the student with diagnostic and experimental techniques for the characterization of antigens, antibodies, and antigen-antibody reactions. Prerequisite: Mb 280 or concurrent registration therein. Lab 3, Cr 1.

399. Graduate Thesis—Cr Ar.

FOREST ENGINEERING

Professors Corcoran, Smith, Coordinators

The Forest Engineering curriculum, a joint administrative responsibility of the Agricultural Engineering Department and the School of Forest Resources, combines study of basic physical sciences, mathematics, engineering and forestry to provide students with the indepth training necessary in a career emphasizing the design, planning and management of tree harvesting systems, logging equipment and environmental engineering in general.

Forest Engineering is engineering in a natural environment. Forest engineers are involved in reforestation methods, systems for wood production and harvesting, handling and transportation, forest road systems, design of improvised bridges, soil-water control and conservation, and recreational development.

A unique feature of the Forest Engineering curriculum is that it provides the academic background necessary for full association with both professional engineering and forestry societies. Founded upon intensive study in the physical and natural sciences, the professional subject matter contained in the program is directed toward on-campus as well as off-campus study. The realities encountered in the use of mechanized logging equipment in a natural environment are recognized as the inherent constraints imposed by the interaction of technology, biology and social order.

In addition to basic engineering and forestry courses, four specific areas of forest engineering are dealt with: forest machinery, soil and water control, forest roads and structures, and logging systems planning.

Graduates may find employment as forest engineers with companies producing forest machinery and equipment, with pulp and paper or lumber firms, with federal and state agencies. Positions are open in research and development work, or in direct wood production and processing. Opportunities are nationwide in this new field.

The curriculum in Forest Engineering is a joint responsibility of the College of Engineering and Science and the College of Life Sciences and Agriculture and is accredited by the Engineering Council for Professional Development and through the Society of American Foresters.

The curriculum requires completion of 139 degree hours (including 6 degree hours in Forestry Summer Camp) at an accumulative grade point average of not less than 2.0

Forest Engineering Curriculum

			Credit Hours
BASIC SCIENCES AND MATHEMATICS			49
Ch 11/12	Chemistry	8	
Ps 1 & 2	General Physics	8	
Ms 26, 27, 28, 59	Calculus & Diff. Equations	16	
Ge 7 (or Cs 81 or Cs 83)	Computer Programming	3	
Bio 1	Basic Biology	4	
Fy 4 (or Ms 134)	Statistics	3	
	*Bio-Earth Science Electives	7	
ENGINEERING			36
Ge 1 (or 16)	Intro. to Design	2	
Sv 5	Plane Surveying	3	
Me 33	Thermodynamics I	3	
Me 50	Statics	3	
Me 51	Strength of Materials	3	
Me 52	Dynamics	3	
Me 59	Fluid Mechanics (or Ce 26 Hydraulics)	3	
AE 20	Principles of Mechanization	3	
AE 55	Materials in Ag. Eng.	3	
AE 165	Soil & Water Engineering	4	
IDL 173	Forest Roads & Structures	3	
IDL 174	Forest Power and Machinery	3	

FORESTRY			32
Fy 1	Intro. to Forest Resources (Audit)	0	
Fy 5	Forest Biometry	3	
Fy 6 (or IDL 106)	Photogrammetry and Remote Sensing	3	
Fy 7	Silvics (Forest Ecology)	4	
Fy 8	Sivilculture	3	
Fy 13	Harvesting of Forest Crops	2	
Fy 41S	Summer Camp	6	
Fy 146	Forest Policy & Administration	3	
Fy 149	Timber Management and Valuation	4	
Fy 171	Production Analysis in Forestry	2	
Fy 172	Planning and Control of Forest Operations	2	
HUMANITIES, SOCIAL SCIENCES, AND COMMUNICATIONS			22
	Communications	6	
	Economics	6	
	Electives	10	
	TOTAL		139

*Recommended electives include:—

S3	Forest Soils
Bt 33	Dendrology
Bt 156	Forest Pathology
En 27	Forest Entomlogy

NATURAL RESOURCES

Natural Resources Committee: Professors Delphendahl, Agricultural and Resource Economics (Chairman); Knight, Forest Resources; Smith, Agricultural Engineering; Associate Professor Swasey, Plant and Soil Sciences.

The Natural Resources curriculum program is an interdisciplinary program of study. It provides training in the physical and social aspects of resource use. Emphasis is placed on the broad interrelationship of the resource base and the effects resource use causes on the quality of the resources. The quality of the environment is affected by the use of resources is of increasing concern regionally and nationally.

An option in Land Use Planning can be selected as part of the Natural Resource degree program. This is a para-professional program that provides the student an introduction to land use planning.

Natural Resources Curriculum

Required Courses		**Credit Hours**	**Minimum Degree Hours Required**
A. UNIVERSITY LIFE			0
B. PHYSICAL SCIENCES AND MATHEMATICS			15
Ch 11/12	General Chemistry	8	
Ms 22 (or Ms 26)	Algebra & Trigonometry	4	
C. BIOLOGICAL SCIENCES			14
Bio 1	Basic Biology	4	
Fy 19	Ecology	3	
	Electives**	7	
D. EARTH SCIENCES			7
Gy 5	Geology for Foresters	3	
S 2 (S3)	Soil Science	3	
S 2L (S3L)	Soil Science Lab	1	
E. HUMANITIES AND SOCIAL SCIENCES			15
Ec 10	Principles of Economics	3	
Pol 3 (or Poll)	State Government	3	
	Electives‡	9	

F. COMMUNICATIONS			12
Eh 1	College Composition	3	
Eh 17	Advanced Professional Exposition	3	
SC 3	Fundamentals of Public Speaking	3	
SC 57	Business & Professional Speaking	3	
G. RESOURCE RELATED COURSES			29
AE 41	Energy and Man	3	
ARE 71	Economics of Environmental Quality	3	
ARE 171	Land Resource Economics	3	
Fy 146	Forest Policy & Administration	3	
P 21	Crop Science	3	
S 50	Soil & Water Conversation	2	
S 52	Land Use Planning - Soil Aspects	2	
	Electives‡‡	10	
H. STATISTICS AND PROGRAMMING			6
Cs 21	Computer Programming	3	
Ms 19 (Fy 4)	Princ. of Statistical Inference	3	
I. FREE ELECTIVES			22
Any course in the University for which the student is qualified.			
MINIMUM DEGREE HOURS FOR GRADUATION			**120**

*Choose from the following fields: Chemistry, Geology, Mathematics, Physics.
**Choose from the following fields: Botany, Biochemistry, Entomology, Microbiology, Zoology.
‡Choose from the following fields: Agricultural & Resource Economics, Anthropology, History, Literature, Modern Society, Philosophy, Political Science, Psychology, Sociology, Speech.
‡‡Choose from the following courses: AE 42, Metals and Man; ARE 186, Government Policies Affecting Rural America; Fy 53, Forest Recreation Management; and Fy electives; S 152, Soil Classification; S 153, Soil Morphology and Mapping.

B.S. DEGREE IN NATURAL RESOURCES
LAND USE PLANNING OPTION

The goal of this para-professional option is to provide the student with an introduction to land use planning. Students graduating from this program may find employment opportunities with private industry, federal, state or local agencies related to resource use and management.

REQUIRED COURSES		**Hours Required**
ARE 174	Land Use Planning (Hum. & Soc. Sci.)	3
Sv 5	Plane Surveying (Free Elective)	3
Fy 6	Photogrammetry & Remote Sensing (Res. Rel. Courses)	3
Ge 16	Cartographics (Res. Rel. Courses)	3
Pol 151	Public Administration (Hum. & Soc. Sci.)	3
S 152	Soil Classification (Res. Rel. Courses)	3
TOTAL		18

The required courses in the land use planning option can be taken as part of the Natural Resource degree program within the 120 degree hours. Field identifiers in the parentheses are those under which the course can be taken.

RECREATION AND PARK MANAGEMENT (RPM)

Professor Pullen (Coordinator); Associate Professors Mitchell, Montville, Newby; Assistant Professor Reiling

The RPM curriculum offers students professional education in the management and administration of recreation and park resources. Program objectives include the development and application of skills associated with administrative and managerial positions in the recreation and park management fields. Specializations can be pursued in either management or interpretation concentrations.

Rapidly changing social phenomenon associated with leisure time, energy problems, population distributions, and land use are creating a favorable demand for personnel trained in the management of recreation and park resources. Employment opportunities are expected to increase steadily over the next several years.

In this baccalaureate degree program offered by the College of Life Sciences and Agriculture, students are required to take a basic core of courses in the physical, biological, and social sciences and humanities. Additional technical and professional courses in one of two specialty clusters (management or interpretation) will fulfill the requirements for a B.S. degree in Recreation and Parks Management.

RECREATION AND PARKS

			Credit
A. ORIENTATION			0
B. MATHEMATICS AND PHYSICAL SCIENCES			14
Ms 22	Algebra & Trigonometry		
or			
Ms 26	Analytic Geometry & Calculus	4	
Cs 81	Computer Programming	3	
Ch 11	General Chemistry	4	
Ms 19	Statistics (or Fy 4)	3	
C. BIOLOGICAL SCIENCES			14(15)
Bio 1	Basic Biology	4	
P 31	Landscape Plant Material	3(4)	
(May substitute:			
Bt 33 Dendrology or Bt 164 Taxonomy of Vascular Plants)			
Zo 4	Animal Biology	4	
Fy 19	Ecology	3	
D. EARTH SCIENCE			7
Gy 1	Aspects of Natural Environment		
or		3	
Gy 5	Geology for Foresters		
S 2 or 3	Soil Science	4	
E. SOCIAL SCIENCE AND HUMANITIES			15
Ec 10	Economics	3	
Ba 9	Accounting	3	
Pol 1	American Government	3	
IDL 24	Sociology of Rural Life		
or		3	
Sy 3	Introduction to Sociology		
Electives: (recommended)		3	
	Ay 1 Anthropology		
	Ay 115 Basic Theory/Principles in Cultural & Social Anthropology		
	At 125 Oral History & Folklore		
	Hy 177 History of American Environment		
	Py 1 General Psychology		
	Py 130 Social Psychology		
F. COMMUNICATIONS			9
Eh 1	College Composition	3	
Sc 3	Public Speaking	3	
Electives:		3	
	Eh 17 Professional Exposition		
	Sc 45 Discussion & Inquiry		
	Sc 57 Business & Professional Speaking		

G. PROFESSIONAL PREPARATION 32

AE	Park Maintenance & Operation	3
Fy 11	Fire Control	2
Fy 53	Forest Recreation Management	2
Fy 53R	Forest Recreation Management Recitation	1
Fy 128	Wildlife Management	3
Fy 149	(sec 02) Forest Management	3
Fy 153	Natural & Cultural Heritage Interpretation	3
Re 69	Foundations for Recreation	3
IDL 169	Recreation Planning & Design	3
Are 162	Recreation & Park Administration	3
Electives:		6

LSA 115 Cooperative Education
or
Special Problems
P 34 Agrostology
Re 110 Outdoor Preparedness
Re 145 Community Recreation
Pe 50 First Aid & Emergency Care

H. CONCENTRATION CLUSTER (Select One) 29

(1) INTERPRETATION:

Ay 125 Oral History & Folklore	3
Ay 170 Introduction to Archeology	3
Ba 123 Principles of Management & Organization	3
EDC 133 Instructional Media	3
EDC 134 Teacher-made Instructional Materials	3
Hy 177 History of American Environment	3
Jr 61 Photojournalism	3
or	
Ps 31 Photography	3
Pol 151 Public Administration	3
IDL (____)Cultural Resource Management	3
Fy 60 Seminar	2

(2) MANAGEMENT:

ARE 71 Economics of Environment Quality	3
ARE 171 Land Resource Economics	3
Ba 30 The Legal Environment of Business	3
Ba 123 Principles of Management & Organization	3
Pol 151 Public Administration	3
ARE 194 Seminar	2
Electives:	12

Are 174 Land Use Planning
Ba 151 Business Finance
Ba 163 Marketing
Ba 165 Advertising
Ba 167 Sales Management
Pol 3 State Government
Pol 152 Administrative Law
Pol 153 Administrative of Public Personnel
Pol 154 Public Budgeting & Financial Administration
Pol 158 Public Opinion

I. FREE ELECTIVES	10
MINIMUM REQUIREMENTS FOR GRADUATION	130

School of Forest Resources

Director Knight; Associate Directors (Wildlife) Coulter; (Administration) Ashley; Professors Ashley, Corcoran, Coulter, Griffin, Knight, McCormack, Owen, Shottafer, Young; Associate Professors Banasiak, Field, Gilbert, Hale, Hoffman, Newby, O'Keefe, Robbins, Shepard, Sherburne; Assistant Professors Brann, Houseweart, Hunter, Jagels, May; Instructor Tebbetts; Superintendent Taylor; Associate Scientists Kemp, Krall, Matula, Seymour; Faculty Associates Blum, Crawford, Frank, Irland, Longcore, Mott, Palmer, Redfield, Saviello, Solomon, Spencer, Webb

Four undergraduate curricula with nine sequences are offered in the School of Forest Resources. The objectives are: (1) to prepare students for careers in forest land management, forest products harvesting, manufacture and sale, forest engineering, forest biology and ecology, outdoor recreation, wildlife management, wildlife biology and ecology; (2) to provide the necessary background to prepare qualifying students for graduate studies; (3) to provide a broad University education for effective citizenship.

Graduation requirements in the School of Forest Resources are: (1) passing grades in all required courses; (2) successful completion of 133 degree hours plus summer camp (6 hours), as required in the curriculum and sequence selected; (3) an accumulative average of not less than 2.0.

FORESTRY AND FOREST PRODUCTS

The sequences for Forestry and Forest Products offer students an opportunity to qualify for a degree in forestry, membership in the Society of American Foresters or other professional societies and for civil service positions in public agencies and for positions with private industry employing professional foresters. Graduates of the school have been employed in about equal numbers by private industry and public agencies. Students with qualifying grades are encouraged to pursue graduate work. All sequences provide an opportunity for a broad education by requiring both cultural and scientific courses supplemented by several hours of electives.

The school also offers an opportunity for students to be certified to teach high school forestry management (see Agricultural and Natural Resource Education).

The Dwight B. Demeritt Forest is managed by the school. This major tract (1,750 acres) under management lies within two miles of campus and is used extensively as a field laboratory for research. A smaller area, the Fay Hyland tract (350 acres) is managed in a natural state as a recognized National Landmark. This unit is especially useful in teaching the plants of wetland sites.

Field and work experience is essential to foresters and students are advised to obtain summer employment in the forest environment if possible. All students **must** attend a six week summer field program immediately following the sophomore year. This field session is currently held in western Maine near Sugarloaf and in the White Pine region near Bridgton.

The program in Wood Science and Technology emphasizes the study of the properties and basic structural components of wood, as well as the conversion and distribution of wood-based products. The off-campus training phase of this program provides for approval employment experience followed by a comprehensive report as a possible alternative to summer camp requirements.

WILDLIFE MANAGEMENT

The two sequences in Wildlife Management offer a broad training in the natural sciences. The management sequence is designed to train students for forest-land, game habitat management, and for, graduate work. The biology sequence is designed for students who are most interested in biology and who plan to do graduate work. Upon completion of the curriculum requirements the student is granted the degree of bachelor of science in wildlife management.

Off-campus training of six weeks is required after the sophomore year of all students in the wildlife sequences. Field experience is important to wildlife managers and students are urged to obtain summer field employment.

Seniors and graduates are eligible for Civil Service examinations for positions with federal and state agencies that administer natural resources.

The Maine Cooperative Wildlife Research Unit provides for a cooperative wildlife program sponsored and financed by the University, the Maine Department of Inland Fisheries and Wildlife, the U.S. Fish and Wildlife Service, and the Wildlife Management Institute. The director of the school is the University representative on the Coordinating Committee. The purpose of the unit is to conduct and promote research, graduate training and public education in the wildlife field.

FOREST ENGINEERING

The bachelor of science degree in Forest Engineering is a program administered by the School of Forest Resources and the Agricultural Engineering Department. It is designed to meet the accreditation requirements of both the engineering and forestry professions. The program offers a unique opportunity to prepare for a diversity of challenging careers that direct engineering principles toward the needs of the forest environment. See Index.

RECREATION AND PARKS

The Recreation and Parks Management program is interdisciplinary and is administered by a committee made up of representatives from the Department of Agricultural and Resource Economics, the Department of Plant and Soil Sciences and the School of Forest Resources. Faculty from each of these Units are involved in teaching recreation courses and advising students. See Index.

NATURAL RESOURCES

The Natural Resources Program is interdisciplinary in the College of Life Sciences and Agriculture with the cooperating units of agricultural and Resource Economics. Agricultural Engineering, Plant and Soil Sciences, and Forest Resources. This general program is available to students who wish to transfer from programs in the School to Forest Resources. The student's advisor may continue to be a faculty member in the school. See Index.

GRADUATE STUDY

Students are accepted for graduate work in both forestry and wildlife management. Course requirements are flexible in the School of Forest Resources so that students may be provided the best education available for their particular objectives, previous training, and thesis interest. Further details are available in the Graduate School catalog and from the School of Forest Resources. Three degrees are offered: the Master of Science in Forestry and in Wildlife Management and the Ph.D. in Forest Resources.

CURRICULA AND AVAILABLE SEQUENCES

Students in Forest Resources have nine sequences from which to choose their program.

Forest Management	Forest Utilization
Wildlife Biology	Forestry (options)
Wildlife Management	Wood Science and Technology
Natural Resources*	Forest Engineering*
Recreation and Parks*	

*Interdisciplinary programs.

Freshman Year

The programs in the School of Forest Resources vary from the start through the differences between sequences are minor during the first (freshman) year. Students are not required to select specific upperclass specialization until near the end of the second semester.

Basic Core: All students are required to take the following 56 credit hours of core courses:

		Required Hours			Required Hours
Bio 1	Basic Biology	4	Ms 26	Anal. Geom. & Calc.	4
Zo 4	Animal Biology (or Bt 2)	4	Ms or Cs	Advanced Math	3

Ch 11/12	General Chemistry	8	Ec 10	Prin. of Economics	3
Bt 33	Dendrology (or Bt 164)	4	Fy 1	Intro. to For. Res.	2
Eh 1	College Composition	3	Fy 4	Stat. Inf. in For. Res.	3
Eh 17	Advanced Prof. Exposition	3	Fy 7	Silvics	4
SC 3	Fund. of Public Speaking	3	Fy 60	Seminar	2
				Hum. and Soc. Sci.	6
		29			27

Additional Required Courses

Three Forestry Sequences			Two Wildlife Sequences		
Ge 16	Cartographics	3	Zo 131&132	Vertebrate Biology	8
Sv 5	Plane Surveying	3	Fy 19	Ecology	3
Fy 5	Forest Biometry	3	Fy 21	Wildlife Summer Session	6
Fy 8	Silviculture	3	En 26	Entomology (or Zo 153)	4
S 3	Forest Soil Science	3	Cs 81	Computer Programming	3
Fy 112	Wood Technology I	3	Fy 127	Wildlife Biology	4
Fy 149	Timber Mgt. & Valuation	4	Fy 137	Practice of Wildlife Mgt.	4
Ps 6	Physics	5	S 3	Forest Soil Science	3
Fy 144	Forest Economics	3	Ps 1a&2a	Physics	8
Fy 146	Forest Policy & Admin.	3	ARE 171	Land Resource Economics	3
Fy 41	Practice of Forestry	6	ANV 144	Wildlife Diseases	3
			ARE 174	Land Use Planning	3
		39			52

Specific Sequence Requirements

Forest Management Sequence			Forestry Option Sequence*		
En 27	Intro Entomology (Fy)	3	En 27	Entomology (or Bt 156)	3
Gy 5	Geology for Foresters	3	Fy 19	Ecology	3
Fy 6	Photogrammetry & Remote Sensing	3	Fy 149	Timber Mgt. & Valuation	4
Fy 19	Ecology	3		Required Elec. in Option	20
Fy 11	Forest Fire Control	2		Conservation Inf. & Ed.	
Fy 53	Forest Recreation Mgt.	2		Conservation Education	
Fy 13	Forest Harvesting	2		Forest Products Marketing	
Fy 128	Wildlife Mgt.	3		Forest Protection	
Fy 157	Watershed Mgt.	3		Forest Recreation	
Ba 9	Princ. of Accounting	3		Computing	
Fy 10	Forest Planting	3		Surveying	
Fy 149	Timber Mgt. & Valuation	4		Urban & Com. Forestry	
Bt 156	Forest Pathology	4		Watershed Management	
				Land Use Planning	
				LS & A Minor	
		38			30

Forest Utilization Sequence			Wildlife Management		
Ba 9	Princ. of Accounting	3	Ba 9	Princ. of Accounting	3
Fy 116	Wood Anatomy	3	Fy 6	Photogrammetry & Remote Sensing	3
Fy 14	Primary Wood Processing	3		Policy & Administration	3
Fy 125	Wood Technology II	3		Communications	3
Fy 13	Forest Harvesting	2	Fy 149	Timber Management	4
Fy 11	Forest Fire Control	2	Zo 171	Fishery Biology	4
Fy 149	Timber Mgt. & Valuation	4			
Fy 55L	Wood Indent. & Prep. Lab	2			
		22			20

Wildlife Biology

Policy & Administration	3
Communications Skills	3
Organic Chemistry/ Biochemistry	4
Genetics or Physiology	4
Additional Math.	3
	17

*The Option sequence provides students an opportunity to specialize in various options. Students must select 15 to 24 credits in one of the listed options. Options should be selected by the end of the sophomore year.

Wood Science and Technology

Ge 16	Cartographics	3	Fy 41	Practice of Forestry or Field Experience	6
Bt 135	Plant Anatomy	4			
Fy 5	Forest Biometry	3	Fy 14	Primary Wood Proc.	4
Fy 112	Wood Tech I	3	Fy 125	Wood Tech II	3
En 27	Intro. to Entomology	3	Ps 1 & 2	Physics	8
Fy 116	Wood Anatomy	3	Bt 156	Forest Pathology	4
Ms 27	Anal. Geom. & Calc.	4	Fy 144	Forest Economics	3
Fy 55L	Wood Ident. & Prop. Lab	2			
					53

The sequences in Forest Engineering, Recreation and Park Management and Natural Resources may be seen in other pages of the catalog. See Index.

Courses in the School of Forest Resources (Fy)

1. Introduction to Forest Resources—Instruments and techniques for field measurements—orientation. Required of freshmen in the School of Forest Resources. Rec 1, Lab 3, Cr 2.

31a. Introduction to Forest Resources—Same content as Fy 1, except no lecture orientation is given. Transfer students only. No freshmen. Lab 3, Cr 1.

4. Stastical Inference in Forest Resources—Elementary statistical background and sampling procedures based on statistics in forestry and wildlife. Use of desk calculators and introduction to electronic computers. Prerequisite: Ms 4, Rec 2, Lab 3, Cr 3.

5. Forest Biometry—Determination of volume of standing and felled timber. Construction of log rules, volume tables, and yield tables. Determination of growth and yield. Prerequisite: Fy 1, Fy 4. Rec 2, Lab 3, Cr 3.

6. Photogrammetry and Remote Sensing—Construction of planimetric and topographic maps by photogrammetric methods. Determination of forest types and stand composition by interpretation and measurements of air photos. Prerequisite: Ge 2 or Ge 16, or permission. Rec 2, Lab 3, Cr 3.

7. Silvics (Forest Ecology)—Biological principles and environment factors governing the natural establishment and development of forest trees and stands. Prerequisite: Bt 33, or Bt 164, Fy 21 or Fy 41 or permission. Rec 2, Lab 3, Cr 4.

8. Silviculture—Technical methods of controlling the composition, growth, quality, and regeneration of forest stands. Prerequisite: Fy 7. Rec 2, Lab 3, Cr 3.

10. Forest Planting—The planting, care, and selection of stock in nursery and field plantings. Seed collecting and processing. Mechanical planting and field techniques. One-day field trip required. Prerequisite: Fy 41. Rec 1, Lab 3, Cr 2.

11. Forest Fire Control—Forest fire behavior as influenced by fuels, weather, topography. Ecological effects of fire. Methods of preventing and controlling fires. Use of fire in forest management. Prerequisite: Fy 19 or permission. Rec 2, Cr 2.

11L. Forest Fire Control Laboratory—Prerequisite: Fy 11. Lab 2, Cr 1.

13. Harvesting of Forest Crops—Harvesting methods in the various regions of the United States and Canada, with special emphasis on the Northeast. Discussion or organization, costs, equipment, and trends. Prerequisite: Fy 14 or permission. Rec 2, Cr 2.

14. Primary Wood Processes—Introduction to the conversion processes involved with the principal primary forest products, such as lumber, pulp, veneer, and derived products. Characteristic properties of typical products; effect of raw material on processing technology. Rec 2, Lab 3, Cr 4.

17. Wood Drying and Preservation—Movement of liquids in wood; causes of deterioration; preservatives. Methods of drying of wood products; planning, construction and operation of commercial facilities. Rec/Lab, Cr 2. (Fy 17a, Wood Preservation, may be taken separately. Rec/Lab, Cr 1).

19. Ecology—The relationships between living organisms and their environment. The ecosystem, ecological factors, succession, community distribution, populations and the role of ecology in natural resources. Resource majors only. No freshmen. Prerequisite: Bio 1. Rec 3, Cr 3.

IDL 19. Ecology—An introduction to ecology emphasizing ecological principles and their relationships to the natural environment and man. Not open to majors in the biological sciences or resource management areas. Prerequisite: Bio 1. Rec 3, Cr 3.

21. Wildlife Ecology—Field problems in forest-wildlife ecology. Recognition, measurement analysis and interpretation of problems in forest-wildlife relationships. Six weeks in summer session.

A. Plant Communities, Sampling and Analysis	Cr 2
B. Ecosystem Analysis	Cr 2
C. Wildlife Ecology	Cr 2
	6

30. Wildlife Law Enforcement—The role of law enforcement in modern wildlife management. History and development of law and relationship to present policies. Description of organizations. Operations and duties of personnel. Wildlife majors only. Rec 3, Cr 3.

41. Forest Resources (Summer Camp)—Field practice in methods and problems involved in the management of a large forest property. Prerequisite: Fy 5, Sv 5 or permission. Forest Resource majors only. Made up of 4 courses as follows:

A. Forest Resource Management—Cr 2.

B. Forest Biology—Cr 1.

C. Forest Resource Sampling—Cr 2.

D. Forest Land Surveying—Cr 1.

45.46. Special Problems—Original investigation in forestry and wildlife work, the subject to be chosen after consultation with the staff. Open to high-ranking juniors and seniors. Cr Ar.

53. Forest Recreation Management—Methods of evaluation, planning and development of wildlands for recreation. Importance, problems and trends. Public and private programs and policies. Offered to Forest Resources majors or by permission of instructor. Rec 2, Cr 2.

53R. Forest Recreation Management Recitation—Specific case studies of recreation resources management as a basis for decision-making, planning, conflict resolution, and socio/psychological behavior analysis in outdoor recreation settings. Prerequisites: RPM or General Forestry/Forest Recreation option majors currently enrolled in Fy 53 or permission of instructor. Cr 1.

55L. Wood Identification and Properties Laboratory—Prerequisite: Fy 55. Lab 4, Cr 2.

60. Seminar—Reviews of literature measurement and analysis of specific problems in forest and wildlife resources. Seniors in Forest Resources. Prerequisite: Fy 137 or Fy 149. Rec 4, Cr 2.

IDL 106. Photogrammetry—Procedure and methods used to derive metric data from photographs. The use of aerial photographs to prepare topographic maps of the earth's surface. Rec 2, Lab 3, Cr 3.

112. Wood Technology I—The structural and physio-chemical nature of wood and its response to environmental, physical, and chemical influences. Growth-material relationships and basic laboratory techniques. Prerequisites: Bt 2. Lec 3, Cr 3.

116. Wood Anatomy—Identification and anatomical characteristics of wood and wood fibers by gross and microscopic features. Prerequisite: Fy 55L or Bt 135 or permission. Lec 2, Lab 4, Cr 4.

125. Wood Technology II—The mechanical properties of wood and wood composites and their use in structural applications. The relationship of mechanical and physical properties to basic processing techniques. Prerequisite: Fy 112 or permission. Rec 2, Lab 2, Cr 3.

126. Process Analysis in Forest Utilization—Processing research and development problems and review of current methods of analysis and solution. Application of process design, systems analysis and materials technology in the investigative situation. Prerequisite: permission of instructor. Rec 2, Lab 2, Cr 3.

127. Principles of Wildlife Biology—The principles of wildlife biology. Study of the biological, economic and human relations factors influencing wildlife resources. Prerequisite: Fy 19, Bt 164, Fy 7, Zo 131, and junior Wildlife major. Rec. 3, Lab 2, Cr 4.

128. Wildlife Management—The practice of wildlife management. Study of the biological, economic and human relations factors influencing management programs. For non-wildlife majors. Rec 3, Cr 3.

129. Research Methods in Wood Technology—Advanced methods of evaluating wood, wood based, and related materials. Introduction to techniques and concepts of evaluation design. Review of pertinent laboratory equipment and its applications. Prerequisite: Fy 4, Fy 125. Rec 1, Lab 4, Cr 3.

137. Practices of Wildlife Management—Consideration of the biological, social, and economic factors influencing the development and implementation of wildlife management programs. Review of past and present programs. Prerequisite: Fy 21 and Fy 127. Rec 2, Lab 4, Cr 4.

144. Forestry Economics—Forest resources of U.S. and the world and prospects of meeting increased demand for forest products. Economic factors in forest production and use of economic analysis in making forest management decisions. Prerequisite: Ec 10 or permission. Rec 3, Cr 3.

146. Forest Policy and Administration—Federal, state and private forest policies in U.S. Comparisons to foreign countries. Land ownership and usage. Administration of national, state and private forests. Organizing, staffing, and equipping forestry enterprises. Junior or senior majors in Forest Resources or permission. Rec 3, Cr 3.

149. Timber Management and Valuation—Managing forest properties for sustained yield of timber products. Determination of annual cut and effect of taxation. Evaluating forest investments. Preparation of management plans. Majors, Forest Resources. Prerequisite: permission of instructor. Rec 3, Lab 2, Cr 4.

153. Natural and Cultural Heritage Interpretation—Study of interpretation of natural and cultural resources with emphasis on philosophy, methods, and techniques; planning, design, construction, implementation, and evaluation of interpretive methodology and systems. Prerequisites: RPM or General Forestry/Forest Recreation majors. Fy 53 Forest Recreation Management. Cr 3.

157. Forest Watershed Management—Role of forests in water cycle. Effect of logging, recreation, mining, and other forest land uses on water resources. Prerequisite: Fy 4, Fy 7, (or their equivalents) S 3, or permission of instructor. Rec 2, Lab 2, Cr 3.

IDL 162. Recreation and Park Management—Fundamental management consideration related to the administration of recreation and park programs. Prerequisite IDL 161 or permission. Rec 3, Cr 3.

171. Production Analysis in Forestry—Concepts and procedures used in the evaluation of timber production and forest production manufacturing. Organization, work measurement, inventory control, capital budgeting, cost control, network analysis and schematic models. Seniors, graduate students, or consent of instructor. Rec 2, Cr 2.

172. Planning and Control of Forestry Operations—Applications of scientific methods to management decision problems of forestry operations. Mathematical programming, markov processes, waiting-line analysis sequencing, simulation, and competitive strategies. Seniors, graduate students, or consent of instructor. Rec 2, Cr 2.

IDL 173. Forest Roads and Structures—Design construction, and maintenance of improvised road systems and bridges; road-vehicle interactions; design and construction of light buildings for forest and recreational use. Prerequisite: Ps 1 or Ps 6. Lec 2, Lab 3, Cr 3.

IDL 174. Forest Machinery—Power sources for forest operations, construction principles,

testing and rating, design and use of forest machinery, power requirements, selection, and engineering aspects of machinery systems design. Prerequisite: Ps 1 or Ps 6. Lec 2, Lab 3, Cr 3.

209. Advanced Silviculture (Seminar)—Applied silvicultural practices and results of current silvicultural research in important forest types of the United States. Prerequisite: Fy 8. Rec 2, Cr 2.

210. Forest Tree Improvement—Investigates the distribution of genetic variation in forest tree populations. The principles and practices of individual tree selection, progeny testing, seed orchard establishment, interspecies hybridization, provenance testing, and the introduction of exotic species are examined. Prerequisite: Fy 8, Fy 10 or permission. Lec 3, Cr 3.

215. Research Techniques in Wood Anatomy—Preparation of woody tissue for light microscopic examination and recording, including microtechniques and photomicrographic methods. Introduction to electron microscopy and interpretation of wood ultrastructure. Prerequisites: Bt 150 and Fy 116, or permission. Lec 2, Lab 4, Cr 4.

228. Ecological Energetics—A study of the energy relations of individuals, populations and ecosystems. Factors affecting the energy requirements of animals, sources of energy available to animals and the role of energy in the structure and function of ecosystems will be stressed. Permission of instructor. Lec 3, Lab 2, Cr 4. Several field trips included. Spring Alternate years.

230. Wood Physics—Study and evaluation of non-mechanical physical properties of wood; principally response to liquids, vibrational stimulation, heat, electricity and ionizing radiation. Prerequisite: an understanding of basic physics and wood anatomy or permission of instructor. Rec 2, Lab 2, Cr 3.

232. Forest Influences—Effects of forest vegetation upon climatic factors, soil water, stream flow, floods, erosion, and soil productivity. Prerequisite: Fy 7 and S 3. Rec 2, Cr 3.

234. Concepts and Theory of Wildlife Ecology—The concepts of the ecosystems, ecological niche, biotic succession, and limiting factors will be examined in detail. Permission of instructor. Lec 3, Cr 3. Spring Alternate years.

247. Advanced Forest Biometry—Sampling methods and the principles of regression analysis as applied to forest resources and the biological sciences. Prerequisite: Fy 4 or Ms 19, S 271 or equivalent. Rec 3, Cr 3.

254. Forest Recreation Planning—Methods of measuring, analyzing, and forecasting recreational use of forest lands. Concepts of planning, and their applicaton to forest recreation management. Prerequisite: Fy 53, IDL 161, or permission of instructor. Rec 3, Cr 3.

256. Evaluation of Wildlife Populations—Estimation and interpretation of abundance, mortality, fecundity, dispersal, spatial pattern, and numerical trends in wildlife populations. Prerequisites: one course each in statistics and ecology. Lec 2, Rec 2, Cr 3.

276. Forest Inventory and Growth—Principles and exploration in detail of approaches to inventory and growth. Field trips will be required. Forestry juniors, seniors, graduate students, and consent of instructor. Prerequisite: Fy 4 and 5. Rec 2, Cr 2.

301.302. Forest Mensuration Problems—Cr Ar.

303.304. Forest Management Problems—Cr Ar.

305.306. Wildlife Management Problems—Cr Ar.

307.308. Silviculture Problems—Cr Ar.

309.310. Photogrammetry Problems—Cr Ar.

311.312. Research Problems in Forestry Economics—Prerequisite: Fy 144 or equivalent. Cr Ar.

313.314. Forest Recreation Problems—Cr Ar.

315.316. Problems in Wood Technology—Cr Ar.

320.321. Forestry Seminar—Rec 2, Cr 1.

IDL 340. Seminar in Ecology—Cr Ar.

350. Graduate Seminar in Wildlife Science—Cr Ar.

399. Graduate Thesis—Cr Ar.

School of Human Development

Associate Professor Csavinsky (Director); Professors McIntire, Thornbury; Associate Professors Brightman, Cook, Musgrave, Oliver, Schomaker; Assistant Professors, Baranowski, Brandt, Hyatt, King, Webber; Instructor Dalton; Lecturer Healey

Human Development encompasses physical, social, economic, and aesthetic aspects of living in complex, technologically changing societies. Knowledge coordinated from many fields of learning is applied to decision making affecting interpersonal and family relationships, the home environment, management of resources, nutrition, food, clothing, design, and human growth and development. Emphasis is placed upon improving the quality of life of families and individuals by assisting persons to develop competencies for effective living.

The undergraduate curriculum has as its objectives: (1) specialized preparation for a variety of professional careers, (2) general education for personal and family living, and (3) courses for the enrichment of students from all disciplines.

A student's program, leading to the bachelor of science degree, includes courses in the arts, humanities, social and biological sciences, and specialized subjects from the School of Human Development. Students develop an area of specialized study to prepare professionally for such fields as: dietetics, food service administration, teaching in the public schools, and adult or public service agencies in health, family life, home economics, nursery, kindergarten, early childhood, elementary education and extension; home economics in business and consumer service; social and community service. Students may prepare for graduate study leading to research, college teaching and other specialized professional positions.

Programs of study may be developed for students from other countries or those wishing to return to higher education to complete or update their professional preparation.

The dietetics curriculum meets the requirements of the American Dietetic Association for internships and traineeships. Education curricula meet State of Maine certification requirements for specialized fields.

A minimum of 120 semester hours and an accumulative grade point average of 2.0 are required for graduation.

DEGREE REQUIREMENTS

All students are required to take the following 34 hours

Communications		6 Hours
Oral	3	
Written	3	

Physical Sciences — 8 hours

To be selected from biology, botany, geology, chemistry, entomology, physics, microbiology or zoology. One year of this work must be basic courses in laboratory science. Biochemistry is required for food and nutrition, home economics education and health and family life. Chemistry is required for food and nutrition major.

Social Sciences — 12 hours

Py 1 is required and others to be selected from anthropology, sociology, psychology, history, government, economics or modern society. Introductory courses are not to exceed 9 hours.

Humanities — 8 hours

Philosophy, art, literature, music, intermediate and advanced levels of language and honors. (Must represent two fields)

Requirements in pre-professional and professional sequences, and electives to make a total of the required 120 hours.

Additional Required Courses in Professional Sequences

I. CHILD DEVELOPMENT

Students who elect to earn a degree in this area may select one of several options: Elementary Education, Early Childhood Environment, and Social Service Work.

A limited number of students may arrange to spend one semester at the Merrill-Palmer Institute, Detroit, Michigan.

Selected students may participate in the University Affiliated Program (UAP) in the Department of Pediatrics at Eastern Maine Medical Center. An Interdisciplinary Concentration in Developmental Disabilities is required. (See UAP and Interdisciplinary Concentrations in Index.)

Child Development

Option A-Elementary Education

Cf 2	Introduction to Child Development	3
Cf 3	Practicum in Early Childhood Programs	3
Cf 17	Family Interaction	3
Cf 104	Selected Topics in Child Development	6
Cf 120	Creativity and Young Children	3
Cf 121	Cognitive Development	3
Ed B2	American School	3
Ed B4	The Teaching Process	3
Ed M13	The Teaching of Reading	3
Ed M18	The Teaching of Language Arts	3
Ed M114	The Teaching of Arithmetic	3
Ed M115	The Teaching of Social Studies	3
Ed M116	The Teaching of Science	3
Ed M190	Student Teaching	6
Ms 7	Structure of Arithmetic	3
	Total	51

Option B. Early Childhood Environment* (pre-school, day care, hospitals, grades K-3)

Cf 2	Introduction to Child Development	3
Cf 3	Practicum in Early Childhood Programs	3
Cf 17	Family Interaction	3
Cf 104	Selected Topics in Child Development	6
Cf 120	Creativity and Young Children	3
Cf 121	Cognitive Development	3
Cf 122	Program Planning—Kindergarten/Nursery/Day Care	3
Fn 41	Introduction to Food and Nutrition	3
Fn 156	The Nutrition of Children	3
Ed B2	The American School	3
Ed B4	The Teaching Process	3
Ed M18	The Teaching of Language Arts	3
Ed M—		3
Ed M—		3
Cf 119	Supervised Students Teaching in a Selected School	6
LSA 115	Cooperative Field Experience in Early Childhood Environments	6
	Total	57

*Elementary certification with a specialist in early childhood is available under this option.

Option C—Social Service Work in Child Development and Family Life

Cf 2	Introduction to Child Development	3
Cf 17	Family Interaction	3
Cf 104	Selected Topics in Child Development	6
Cf 111	Selected Topics in Family Studies	6
Cf 116	Human Sexuality	3
Cf 153	Adulthood & Aging	3
Cf 155	Adolescence	3
Hm 185	The Family's Financial Problems	3
IDL 24	Rural Sociology	3
or		
Sy 126	Urban Sociology	

Sw 120	Introduction to Social Work & Social Welfare	3
Sw 140	Social Welfare Policy & Issues	3
Sw 161	Social Work Methods I	3
Two Courses from the following:		
Cf 3	Practicum in Early Childhood Programs	3
Cf 104	Selected Topics in Child Development	3
Cf 111	Selected Topics in Family Studies	3
Fn 41	Introductory Nutrition	3
Hm 181	Management for Modern Families	3
Hm 182	Management in Homes	3
Hm 191	Housing	3
Two additional courses from the Behavorial Sciences		6
	Total	51

II. FOOD AND NUTRITION

This program is designed to give professional preparation for those students who want to become dietitians, nutritionists, or food service administrators in commercial, industrial, publicly owned, or private food establishments. These options provide the minimum competencies for admission into an approved American Dietetic Association program (internship or traineeship) or for graduate level education.

A minor in Food and Nutrition consisting of 15 credit hours above introductory level courses is available to any student. For details see the Special Program, Minors, and Courses listing under the College of Life Sciences and Agriculture. See Index.

Dietetic Intern* 66 hours

Fn 41	Introduction to Food and Nutrition
Fn 42	Family Food Management
Fn 143	Experimental Foods
Fn 61/62	Food Service Systems Management I & II
Fn 149	Nutrition Education
Fn 152	Human Nutrition
Fn 155	Abnormal Nutrition
Fn 156	Nutrition of Children
Ba 161	Personnel Management & Ind. Relations
Ed B3	The Growth-Learning Process
MB 127/128	Microbiology
Bio 1	Basic Biology
Zo 4	Animal Biology
Zo 177	Animal Physiology
Ec 10	Principles of Economics
Ch 11/12	General Chemistry
Bc 21	Organic Chemistry
Bc 122	Biochemistry
Sy 130	American Culture
or	
Ay 115	Cultural & Social Anthropology
or	
Ay 2	Introduction to Anthropology

*Approved by the American Dietetic Association and recommended for all dietitians.

III. GENERAL HOME ECONOMICS

The general home economics curriculum provides a balance of cultural, technical, and professional education. Courses are chosen from four groups:

General Education (from basic core)	34 hours
Home Economics (2 courses from each of the five Home Economics areas plus HE 70	

seminar listed under Home Economics Education)	46 hours
Professional Area Courses	24 hours
Electives	16 hours

Each student must choose a program designed to provide competencies in one aspect of the profession plus special interest courses in related areas directed toward a specific professional goal:

Option A — General Home Economics
Option B — Business and Consumer Services
Option C — Clothing, Textiles & Design

IV. HEALTH AND FAMILY LIFE EDUCATION

This program is designed to give professional preparation for those persons who want to become public school teachers or supervisors in the newer fields of health and family life education. The program includes general health education. The content of the curriculum has been designed to fulfill national and state recommendations regarding the preparation needed for such teachers.

General Education (from basic core)	34 hours
Professional Education	22 hours

Ed B2	The American School	3
Ed A 21	Human Dynamics in Education	3
He 172	Techniques in Teaching	3
He 173	Supervised Student Teaching	8
Hper 78	Health Education	2
Hper 183	Planning the Health Education Curr.	3
Major		53 hours
Cf 2	Introduction to Child Development	3
Cf 17	Family Interaction	3
Cf 104	Selected Topics in Child Development	3
Cf 111	Selected Topics in Family Studies	6
Cf 153	Adulthood & Aging	3
Cf 155	Adolescence	3
Cf 116	Human Sexuality	3
Cf 117	Family Life and Sex Education	3
Fn 41	Introductory Nutrition	3
Hm 185	The Family's Financial Problems	3
Mb 21A	Elementary Microbiology Laboratory	1
Mb 127	Microbiology	3
Mb 130	Fundamentals of Public Health	3
Py 110	Mental Hygiene	3
Py 112	Abnormal Psychology	3
Bio 1	Basic Biology	4
Zo 8	Anatomy & Physiology	4

V. HOME ECONOMICS EDUCATION

To meet certification requirements for teachers of consumer and homemaking in the public schools.

General Education (34 hours from basic core)	50 hours
Professional	22 hours

Ed B2	The American School	3
He 70	Introduction to Home Economics and Teaching Environments	1
He 171	Curriculum Development in Home Economics	3
He 172	Techniques in Teaching Home Economics	3

He 173	Supervised Student Teaching	8
He 174	Seminar in Home Economics	1
He 176	Adult Education	3
Home Economics		40 hours

Child Development & Family Relationships	8
Clothing, Textiles & Design	8
Food & Nutrition	8
Housing, Home Furnishings & Equipment	8
Family Economics & Management	8

COURSES IN THE SCHOOL OF HUMAN DEVELOPMENT

Child Development and Family Relationships (Cf)

2. Introduction to Child Development—Influences on the development of the whole child at each stage of development. Theoretical perspectives and empirical evaluations. Some of the practical implication of both. Cr 3.

3. Practicum in Early Childhood Programs—Introductory practicum combining child development and education theory with supervised weekly participation in the Child Development Learning Center. Focuses on the child under six years of age. Prerequisite: Cf 2. Rec 2, Lab 2, Cr 3.

17. Family Interaction—Interpersonal dynamics of dating, courtship, mate selection, and the development of family life. Changing patterns of personal interactions within the family life cycle and a plurastic society. Cr 3.

104. Selected Topics in Child Development—Review of specific subject areas in the field of child development. Subject areas vary by semester. (May be taken more than once for credit.) Prerequisite: Cf 2. Cr 3.

109. Special Problems in Child Development—Prerequisite: permission.

111. Selected Topics in Family Studies—Review of specific subject areas in the field of family studies. Subject areas change each semester. (May be taken more than once for credit.) Prerequisite: Cf 17. Cr 3.

116. Human Sexuality—Sexuality and its social implication against a background of constantly changing sexual mores. Sex role development, alternative conceptualizations of sexuality, and implications for future trends in human interaction. Cr 3.

117. Family Life and Sex Education—Methods and curriculum materials for teaching family life and sex education in grades K through 12. Specific reference to the child's environment. Changing social values and rapid increases in knowledge about human sexuality are discussed. Prerequisite: Cf 116. Cr 3.

119. Supervised Student Teaching in a Selected School—A student teaching program in the Child Development Learning Center to be arranged on a full-day basis for one half of the semester or one half day for the full semester. Prerequisite: Cf 120, 121, 122. Cr 6.

120. Creativity and Young Children—An exploration of creativity; definitions and development of creative process. Experiences in the areas of play, art, literature, music, and dramatics as they relate to creativity. Senior standing. Cr 3.

121. Cognitive Development—Reviews concepts of human learning and cognition. Prerequisites: Cf 2, Py 1. Cr 3.

122. Program Planning in the Kindergarten—Basic teacher responsibilities and skills necessary for effective teaching of kindergarten children. Prerequisites: Cf 2, Cf 3. Cr 3.

153. Adulthood and Aging—Developmental processes and problems in adulthood. Includes topics such as personal growth, learning, social disengagement, death and dying. Prerequisites: Cf 17. Cr 3.

155. Adolescence—Growth and development through the adolescent years. Conceptual models and recent research will be discussed. Prerequisites: Cf 2, 17. Cr 3.

IDL 176. School and Society Study Tour—A field based interdisciplinary study tour of educational facilities such as schools, hospitals, food services and selected agencies in foreign countries. Lectures, seminars, tours and and presentations by teachers and officials. These will supplement guided visits to classrooms, hospitals, food services and agency settings. Cr 3.

205. Psychodynamics of the Family—Prerequisite: Cf 11 or Sy 118 or conengagemensent. Cr 3.

211. Seminar in Family Relationships—Cr 3.

225. Theories of Child Development—Prerequisite: Cf 104. Cr 3.

235. Recent Research in Child Development—Prerequisite: Cf 104 or consent.

240. Theories and Concepts of Family Development—Prerequisite: Cf 111 or consent.

250. Organization and Administration of Early Childhood Education Programs—Cr 3.

260. Seminar in Child Development—Cr. 3.

285. Newer Findings in Child Development and Family Relationships—Cr 3.

301. Supervised Fieldwork in Child Development and Family Relations—Cr 1-6.

309. Family Counseling—Prerequisite: A counseling course and a family course or consent of instructor. Cr 3.

318. Sexuality and Human Interaction—Prerequisite: A course in counseling and a course in family or consent of instructor. Cr 3.

Clothing, Textiles and Related Arts (Cd)

22. Clothing Construction—Principles of clothing construction and fitting with application to garments. Decision-making skills emphasized. Rec 1, Lab 4, Cr 3.

25. Consumer Textiles—Fundamentals of fibers, yarns, fabrications, and finishes as related to consumer selection, use and care of textiles. Cr 3.

31. Design—Selection and organization of design elements in two- and three-dimensional space. Principles of design to achieve visual order in compositions. Experimentation with various media and techniques. Practice in critical thinking and discriminating attitudes toward design forms. Rec 2, Lab 2, Cr 3.

33. Textile Design—Application of design principles to such textile problems as hand weaving, knitting, needlework, quilting and patchwork. Prerequisite: Cd 31. Lab 2, Rec 2, Cr 3.

124-01. Creative Clothing Construction: Comparative Tailoring—Women and men's custom and speed methods of tailoring, including fitting principles and finishing details. Development of three-dimensional form through the construction of a tailored garment. Prerequisite: Cd 22, 124 - 02, or permission. Lab 2, Lec 2, Cr 3.

124-02. Creative Clothing Construction: Flat Pattern Fashion Design—An introduction to the principles of fashion design through the application of flat pattern methods. Development of a personal master dress pattern and the creation of an original dress design. Prerequisite: Cd 22 or permission. Lab 2, Lec 2, Cr 3.

128. Seminar: Dress in Human Development—Interdisciplinary study of clothing within the context of cultural, social, psychological, physical, economic, and aesthetic relationships. Cr 3.

129. Special Problems in Clothing and Textiles—Cr 1-3.

133. Textile Decoration—Application of design principles to surface decoration on textiles. Techniques, such as silk screen, batik, and direct dye will be investigated. Prerequisite: Cd 31. Lab 2, Rec 2, Cr 3.

139. Special Problems in Design—Cr 1-3.

192. Interior Design—Planning residential interiors to meet human needs of individuals and families. Selections, organization of furnishing and materials. Layout in floor plans and wall elevations. Historic and contemporary interiors and furnishings. Prerequisite: Cd 31 or permission. Rec 2, Lab 2, Cr 3.

231. Graduate Seminar in Textile Design—Cr 1.

237. Research in Clothing and Design—Cr 1-3.

333. Research in Clothing Design—Cr 3-6.

Food and Nutrition (Fn)

41. Basic Nutrition—A survey of food and nutrition principles, including the influence of food patterns on health and physical performance; description of a balanced diet; study of the nutrients, interrelationships, sources, effects of processing and storage, food safety, fads, controversies, and individual dietary studies. Rec 2, Lab 2, Cr 3.

42. Family Food Management—The criteria for making intelligent food choices. Application of those standards in the planning of family meals. Limited amount of food preparation and service. Rec 2, Lab 2, Cr 3.

43. Experimental Foods—An experimental approach to the preparation of foods. Emphasis on the scientific interpretation of results. Prerequisite: Fn 42 and Bc 8 or equivalent. Rec 2, Lab 4, Cr 4.

61. Food Service Systems Management I—Basic principles of quantity food production and service. Emphasis on techniques to retain nutritive value and yield quality products, recipe standardization, portion control, sanitation, and use and care of equipment. Other areas include organizational structure, efficient methods and controls utilized by management in menu planning, purchasing, receiving, and storing of food, beverages, and supplies. Rec 2, Lab 4, Cr 4.

62. Food Service Systems Management II—Supervised observation and administration of selected food services. Theories of management, cost control, pricing, merchandising, purchasing, and training personnel. Local, state, and federal regulations. Current trends affecting management. Prerequisite: Fn 61. Rec 2, Lab 4, Cr 4.

149. Problems in Food and Nutrition Education—Methods and curriculum materials for the nutritionist to meet individual and community health needs. Understanding methods of demonstrating food preparation and preservation. Selection of concepts appropriate for teaching nutrition in health programs in grades K-12, to adult education groups; and in agencies related to supplying food or preventing disease. Prerequisites: Fn 41, 42, senior standing or permission. Cr 1-4.

152. Human Nutrition—Body metabolism and requirements for nutrients by normal individuals under normal conditions. Processes of digestion, absorption, utilization within cells and cell organelles, and excretion of nutrients as an integrated contribution of related scientific disciplines. Prerequisite: Bc 122 and Zo 4 or equivalent. Rec 3, Cr 3.

155. Nutrition in Abnormal Conditons—Principles involved in adjusting diets for diseases and abnormal conditions that may be benefited by variations from normal diets. Prerequisite: Fn 152. Rec 3, Cr 3.

156. Nutrition and Growth—Strategies for meeting nutritional requirements from infancy through pregnancy and lactation. Consideration of food selection in the home, child care centers and schools, with attention to method of preparation, service, and cost. Prerequisite: a course in nutrition or permission. Rec 2, Lab 2, Cr 3.

IDL 50. Forum on Food—Introduction to the broad concept of food, its procurement, distribution, and relationship to human health. Not open to freshmen. Cr 3.

257. Advanced Human Nutrition—Cr 3.

258. Seminar in Nutrition—Prerequisite: Fn 152 or equivalent. Rec 1-2, Cr 1-2.

259. Special Problems in Nutrition: Community Nutrition—Cr 1-6.

300. Readings in Nutrition—Background in biochemistry and physiology required. Cr 2-3.

Home Economics Education (He)

70. Introduction to Home Economics and Teaching Environment—A seminar to introduce the preservice home economists philosophies; components, professional role and opportunities; role of the teacher; students; the educational environment. An introductory course required of all home economics education majors. Rec 1, Cr 1.

171. Curriculum Development in Home Economics Education—Current educational philosophies, principles, and practices; their application to home economics education through program planning and curriculum development. Prerequisite: He 70 or permission. Rec 3, Cr 3.

172. Techniques of Teaching Home Economics—Selection and use of teaching strategies and materials to promote development of concepts and thinking processes in the classroom. Learnings reinforced through microteaching and experience in public school classrooms. Prerequisite: He 70 and 171. Cr 3.

173. Supervised Student Teaching—Teaching in an approved junior or senior high school under direction of the local teacher and University supervisor. Students are expected to live in the school community for eight weeks. Opportunity to achieve competencies in teaching skills, professional role and subject matter concepts. Prerequisite: He 70, 171, and 172. Cr 8.

174. Seminar in Home Economics—Explanation of newer concepts and future developments in home economics as a profession and as related to career opportunities. Rec 1, Cr 1.

176. Adult Education—Need for and purpose of adult education programs. Consideration of learning program development, organization, and administration of programs. Emphasis on adult education through the public schools. Cooperative Extension Service, and community agencies. Rec 3, Cr 3.

279. Special Problems in Home Economics Education—Cr 1-3.

Human Development (He)

349. Investigation of Special Topics—Advanced independent study for qualified students who present suitable projects for intensive, independent investigation in human development. Cr 1-6.

399. Graduate Thesis—Cr arranged.

Home Management and Housing (Hm)

181. Management for Modern Families—Analysis of the managerial process and its relationship to decision making. Emphasis on the use of resources including time, energy, and money to attain family goals. Prerequisite: junior standing. Rec 3, Cr 3.

182. Management in Homes—Comparison of resources and home management practices of families and individuals of different social, economic, and educational levels at various stages of the family life cycle. Observation and analysis of management of resources to achieve goals through field placement with public and private agencies. Prerequisite: Hm 181. Rec 2, Lab 2, Cr 3.

185. The Family's Financial Problems—Influence of outside economic conditions and personal circumstances on family financial problems. The management process applied to family problems involving finances - economic position, meeting living costs, protection against financial contingencies, credit, developing a savings and investment program, legal aspects of transactions. Prerequisite: junior standing. Rec 3, Cr 3.

187. The Consumer in the Present Economy—Distribution of consumer goods through the marketing system, change of marketing institutions; consumer information available, and consumer protection in the market. Emphasis on joint interest of those in marketing, the consumer, and the government in an efficient marketing system. Rec 3, Cr 3.

189. Special Problems in Home Management—Cr 1-3.

191. Housing—Physical, social and emotional aspects of the housing environment. Floor plan principles in relation to family life cycle. Local government controls; natural problems in housing. Prerequisite: junior standing. Rec 3, Cr 3.

193. Equipment—Consumer buying of equipment for the home. Energy conservation in the use of small electric and major appliances. Prerequisite: junior standing. Rec 2, Lab 2, Cr 3.

199. Special Problems in Housing—Cr 1-3.

COURSES GIVEN THROUGH CONTINUING EDUCATION DIVISION, OR SUMMER SESSION

The following courses are given through the Continuing Education Division, or in Summer Sessions.

Food and Nutrition (Fn)

141. Fundamentals of Nutrition—Influence of food patterns on human health. The nutrients, interrelationships, requirements through the life cycle, food sources, effect of pro-

cessing and storage, food fads, safety in food handling, individual diet studies, school nutrition programs, consumerism. Rec 3, Cr 3.

145. Recent Advances in Food and Nutrition—Results of recent research and trends in food and nutrition. Emphasis on their significance for professional home economics and educators. Prerequisite: a nutrition course or permission. Rec 3, Cr 3.

257. Advanced Human Nutrition—Basic scientific and medical discoveries in human nutrition. Emphasis on biochemical and physiological principles. Relationship of diet to human health and well-being. Prerequisite: Bc 122 and Fn 152 or equivalent. Cr 3.

Home Economics Education (He)

175. Advanced Home Economics Education—Current philosophy of teaching home economics; concepts development in selected areas of the field with attendant unit development. Study of department management selection and use of space and equipment, and other pertinent problems related to teaching home economics in secondary schools. Cr 3.

190. Methods of Teaching Home Economics—Methodology effective in teaching at different development levels, in several subject areas, according to objectives of programs. Experimentation in methods and teaching aids, considering class size and time schedule. Emphasis on creative teaching. Review of research in methodology. Rec 3, Cr 3.

111. Supervision of Student Teaching in Home Economics—Theory and principles of supervision for improved educational programs; procedures for improved communication between supervisor and other personnel; evaluation of growth within individuals and programs. Cr 3.

Note: Designed for supervisory teachers, city/county/state supervisors, extension agents, and others in a supervisory capacity. Supervising teachers participating in student teaching programs do so on an individual basis. They must participate in a workshop or institute on the application of supervision theory to student teachers following a course which includes supervision principles and theory. These workshops will be sponsored by the institution with which the teacher will work.

320. Seminar in Home Economics Education—Cr 3.

Home Management (Hm)

199. Special Problems in Housing—Cr 1-3.

286. Management of Household Resources—Rec 3, Cr 3.

AGRICULTURAL SCIENCE DIVISION

AGRICULTURE

This is an interdisciplinary program of study which leads to a baccalaureate degree in Agriculture.

Students who desire a broad education encompassing the full spectrum of agricultural production will find this to be a useful program. Several groups will be especially attracted and include (1) small and part-time farmers, (2) foreign students from the less-developed countries, (3) those interested in teaching agriculture and natural science in high schools, (4) those interested in careers with various agribusiness firms, (5) those desiring to enter or return to commercial farming.

The more specific goals of the program include providing students with (a) the basic principles of production and efficient management of dairy cattle, livestock, poultry, and horses; (b) a balanced educational program in the study of plant production and the soil resource related to crop production; (c) an ability to handle the business management aspect of an integrated farm enterprise; (d) a career as a farmer on a self-employed basis or as a manager of a commercial farm or other agribusiness firm. An option to teach high school agriculture is available. See Agricultural and Natural Resource Educations.

The curriculum in Agriculture is the joint responsibility of the Agricultural Science Departments of Agricultural Engineering, Animal and Veterinary Sciences, Agricultural and Resource Economics, and Plant and Soil Sciences.

This degree requires satisfactory completion of at least 120 degree hours at an accumulative grade point average of not less than 2.0 in a course of study which conforms to the following curriculum.

Curriculum for the B.S. Degree in Agriculture
(See Freshman Programs section)

AGRICULTURE PROGRAM

		Credit	Total
A. ORIENTATION			
LSA 1	Orientation	0	0
B. BASIC SCIENCE & MATHEMATICS			34
Ch 11/12 or Bc 7/8	Chemistry	8	
Ms 22	Algebra & Trigonometry	4	
Ms 18 or 19	Statistics	3	
Bio 1	Basic Biology	4	
Bt 2 or Zo 4	Plant or Animal Biology	4	
Mb 122	Microbiology	3	
En 26	Entomology	4	
Ps 3 (lec & lab)	Physics	4	
Cs 81	Computer Programming (recommended)	3	
C. COMMUNICATIONS			9
Eh 1	College Composition	3	
Eh 17	Professional Writing	3	
Sc 3 or Sc 57	Speech	3	
D. HUMANITIES & SOCIAL SCIENCE			15
ARE 48 or Ec 10	Economics	3	
Pol 3	State Government	3	
IDL 24 or Sy 3	Sociology	3	
	Elective	6	
E. AGRICULTURAL SCIENCES (a minimum of 24 cr. hrs. of 100 -level or higher courses required)			36
Agricultural Engineering			9
Ae 31	Field Machinery Management	3	
Ae 32	Farm Buildings & Equipment	3	
Ae 35	Soil & Water Control	3	
Ae 36	Farm Power	3	
Ae 38	Electrification	3	
Ae 39	Agriculture Processing Technology	3	
Animal and Veterinary Sciences			9
AnV 45	Animal Science (required)	3	
	(Select 2)		
AnV 46	Dairy Cattle Technology	3	
AnV 48	Livestock Management	4	
IDL 65	Meat Technology	3	
AnV 85	Poultry Technology	4	
AnV 136	Physiology of Domestic Animals	3	
AnV 137	Animal Diseases	3	
AnV 156	Applied Animal Feeding	3	
Agricultural and Resource Economics			9
ARE	Farm Management (required)	3	
Ba 9	Accounting	3	
	(Select 1)		
ARE 159	Agricultural Business Management	3	
ARE 165	Food Marketing	3	
ARE 171	Land Resource Economics	3	

Plant and Soil Sciences			10
P 21	Crop Science (required)	3	
S 2	Soils	4	
	(Select 1)		
P 1	Horticulture	3	
P 5	The Home Garden	3	
P 27	Crop Management	3	
P 143	Principles of Weed Control	3	
P 166	Plant Propagation	3	
F. ELECTIVES			26
(Recommended: LSA 115 Cooperative Education 4 cr.)			
Minimum Degree Hours Required for Graduation			**120**

AGRICULTURAL ENGINEERING

Professors Smith (Chairman), Rhoads, Klinge, Rowe; Associate Professors Hedstrom, Huff, Riley, Soule; Assistant Professor Christensen

The Agricultural Engineering Department offers major work leading to the degree of bachelor of science in agricultural engineering, to the degree of bachelor of science in Agricultural Mechanization and jointly administers the degree of bachelor of science in Forest Engineering with the School of Forest Resources.

B.S. in Agricultural Engineering

The Agricultural Engineering curriculum combines study in engineering and mathematics with biological sciences and physical sciences to provide a unique background for solving engineering problems associated with agriculture.

The basic curriculum is strengthened by elective options which permit the student to specialize in one of four areas according to his interests and needs. Areas of specialization are: (1) Machinery and power units for the agricultural industry; (2) Food and fiber processing systems; (3) Design of agricultural structures; and (4) Soil and water conservation engineering. Electives in engineering and the life sciences aid in providing a broad base of knowledge for engineering practice.

Employment opportunities for agricultural engineers are as diverse as the agricultural industry itself. Graduates in agricultural engineering may be employed as design engineers by machinery and farmstead systems manufacturers; as sales engineers by machinery food or chemical companies; as research engineers by industry, government or state experiment stations or in teaching or extension positions by universities. Some practice as consulting engineers. An increasing number of opportunities for foreign service are opening up.

The curriculum in Agricultural Engineering is a joint responsibility of the College of Engineering and Science and the College of Life Sciences and Agriculture.

This degree requires satisfactory completion of at least 130 degree hours at an accumulative grade point average of not less than 2.0 in a course of study which conforms to the following curriculum:

Curriculum for the B.S. Degree in Agricultural Engineering

See Freshman Programs Section

		Credit Hours	Minimum Degree Hours Required
A. AGRICULTURAL ENGINEERING			30
AE 20	Prin. of Mechanization	3	
AE 55	Materials in Ag. Eng.	3	
AE 80	Senior Seminar	1	
AE 81	Department Seminar	1	
AE 82	Intro. to Ag. Eng.	2	
AE 83	Spec. Prob. in Ag. Eng.	1	
AE 160	Agr. Machinery	3	
AE 163	Farm Structures Design	3	

AE 164	Instrumentation and Control Systems	3	
AE 165	Soil & Water Eng.	4	
AE 167	Agricultural Power	3	
AE 169	Agr. Processing	3	
B. BASIC ENGINEERING			28
Ge 1	Intro. to Eng. Design	2	
Ge 2	Intro. to Eng. Design	2	
Ge 7	Computer Programming (or Cs 181)	3	
Me 33	Thermodynamics	3	
Me 50	Statics	3	
Me 51	Strength of Materials	3	
Me 52	Dynamics	3	
Me 123	Design I	3	
Ce 50	Hydraulics (or Me 59 Fluid Mechanics)	3	
Ee 22	Network Fundamentals	3	
C. TECHNICAL ELECTIVES (A group of engineering or science courses selected by the student and approved by the adviser)			9
D. BASIC SCIENCES AND MATHEMATICS			32
Ch 11	General Chemistry	4	
Ch 12	General Chemistry	4	
Me 26	Analytic Geom. & Cal.	4	
Ms 27	Analytic Geom. & Cal.	4	
Ms 28	Analytic Geom. & Cal.	4	
Ms 59	Differential Equations	4	
Ps 1	General Physics	4	
Ps 2	General Physics	4	
E. AGRICULTURAL AND BIOLOGICAL SCIENCE			10
Bio 1	Basic Biology	4	
S 2	Soils	3	
	Electives	3	
F. COMMUNICATIONS, HUMANITIES AND SOCIAL SCIENCE			21
G. OTHER			
LSA 1	Orientation	0	
	Minimum Degree Hours Required For Graduation		**130**

Students transferring to University of Maine after the sophomore year from the University of Massachusetts, New Hampshire, Rhode Island or Vermont under the Regional Program should check the bulletins of those institutions for the first two years in Agricultural Engineering.

Graduate Work in Agricultural Engineering

The degrees of master of science (Agricultural Engineering) and master of engineering (Agricultural Engineering) are offered with options for specialization in soil and water engineering, farm structures, agricultural power and machinery, and electric power and processing.

Several research assistantships are available each year. Incumbents devote half time to research on approved projects of the Agricultural Experiment Station.

B.S. in Forest Engineering

See Forest Engineering for a description of the curriculum and opportunities.

B.S. in Agricultural Mechanization

The curriculum in Agricultural mechanization provides training in specific aspects of engineering technology and couples this with training in business, economics, and agricultural subjects. It is designed to prepare graduates for work in the application of equipment and systems to food production, processing and handling either as field representatives of industrial concerns or as management personnel on mechanized farms.

Graduates find employment as technical sales representatives for machinery companies, farm service advisers for electric power companies, field advisers for fuel companies, machinery managers on corporation farms, field managers for food processors, and as

agricultural contractors. Positions are also available as high school agriculture or mechanics teachers and with equipment companies in the field of product development and product education.

The department also offers an opportunity for students to be certified to teach high school agriculture. (See Agricultural and Natural Resource Education.)

There are two avenues to the B.S. degree in agricultural mechanization. One is by entry to the traditional four-year program, the other is through the two-year Technical Division in a two-plus-two program. (See Technical Division, for this method of admission). By direct entry the bachelor's degree requires satisfactory completion of at least 120 degree hours at an accumulative grade point average of not less than 2.0 in a course of study which conforms to the following curriculum.

Graduates of the Associate Degree programs in the College of Engineering and Science who are qualified for transfer into baccalaureate programs may transfer up to 60 credits for courses in which they have received a grade of C or better. Two additional years will be required to complete the degree of B.S. in Agricultural Mechanization.

Curriculum for Agricultural Mechanization

See Freshman Programs Section

		Credit Hours	Minimum Degree Hours Required
A. AGRICULTURAL MECHANIZATION PROFESSIONAL COURSES			25
AE 20	Principles of Mechanization	3	
Ae 31	Field Machinery Management	3	
AE 32	Farm Buildings & Equipment	3	
AE 35	Soil Water Control	3	
AE 36	Farm & Forest Power	3	
AE 38	Electrification	3	
AE 39	Agric. Processing Tech.	3	
AE 42	Metals and Man		
AE 80	Senior Seminar	1	
B. PROFESSIONAL FIELD SUPPORTING COURSES			24
Ec 10	Principles of Economics	3	
Ba 9	Principles of Accounting	3	
	Electives	18	
	(9 hours must be in LSA courses)		
C. BASIC SCIENCES AND ENGINEERING			23
Ge 1	Introduction to Eng. Design	2	
Ge 2	Introduction to Eng. Design	2	
Ms 22	Algebra & Trigonometry	4	
Ms 19 or Fy 4	Principles of Statistical Inference	3	
Ps 1a	General Physics	4	
Ps 2a	General Physics	4	
Ch 11 or Bc 7	Chemistry	4	
D. AGRICULTURAL AND BIOLOGICAL SCIENCES			16
Bio 1	Basic Biology	4	
AnV 45	Animal Science	3	
S 2	Soils	3	
	Electives	6	
E. COMMUNICATIONS			6
F. HUMANITIES AND SOCIAL SCIENCES			15
G. OTHER			11
LSA 1	Orientation	0	
	Free Electives	11	
	Minimum Degree Hours for Graduation		**120**

Courses in Agricultural Engineering (AE)

Courses numbered 30-50 or 101-150 are intended primarily for the Agricultural Mechanization curriculum or as service courses for students in other departments of the College of Life Sciences and Agriculture.

20. Principles of Mechanization—Basic concepts of farm and forest mechanization; functional analysis and organization of machine systems and materials handling operations. Prerequisite: Ms 22. Rec 2, Lab 2, Cr 3.

‡31. Field Machinery Management—Economic selection of machinery to integrate field operations in food and fiber production systems; efficient management and use of machines and applications of power to field operations. Prerequisite: Ms 22. Rec 2, Lab 2, Cr 3.

†32. Farm Buildings and Equipment—Consideration of environmental control; methods and materials of construction; functional requirements and system economics of production, processing and storage buildings. Prerequisite: Ms 22. Rec 2, Lab 2, Cr 3.

33. Fluid Power Technology—Basic fluid power systems, component installation and function analysis, basic system design, troubleshooting and testing techniques. Prerequisite: Ps 1a/2a or Ps 6 or permission. Rec 2, Lab 3, Cr 3.

†34. Instrumentation—Basic principles and applications of instruments for measuring and controlling such phenomena as temperature, force, pressure, humidity, moisture content and flow rate. Applications to agriculture and biological sciences stressed. Prerequisite: Ps 1a or Ps 6. Rec 2, Lab 2, Cr 3.

‡35. Soil Water Control—Field surveying, planning, layout and construction of soil and water control structures such as farm ponds, drainage systems, irrigation systems and soil erosion control systems. Rec 2, Lab 3, Cr 3.

†36. Farm and Forest Power—Principles of construction, operation, and maintenance of internal combustion engines, tractors, and related equipment. Selection, application, and management of power equipment in farm and forestry activities. Prerequisite: Ms 4, Rec 2, Lab2, Cr 3.

38. Electrification—Fundamentals of electric circuits. Basic wiring techniques and planning of wiring systems. Selection, use, and care of electric devices and controls used in agriculture and forestry. Emphasis on practical application. Rec 2, Lab 2, Cr 3. Prerequisite: Ps 6 or equivalent.

39. Agricultural Processing Technology—A study of unit operations involved in on-farm and in-plant processing of agricultural products. Emphasis on sizing and selecting equipment. Prerequisite: Ms 4, Ps 1a, Ps 2a. Rec 2, Lab 3, Cr 3.

41. Energy and Man—Basic concepts of energy and power. Energy sources and their limitations. Demands for energy, forms in which we use it, and reasons for shortages. Energy conversion, storage, and transport, and their effects on environment. Energy conservation and future use of energy. Lec 2, Rec 1, Cr 3.

42. Metals and Man—The influence of metals technology on society, past and present. After a brief historical review the course covers the scope of our metalic resources, mining and concentration methods, extraction, refining and fabrication. Recycling and environmental effects are examined. Properties of metal, alloying and heat treating are briefly covered. Welding as a fabrication method is studied and electric arc and gas welding instruction is given in the two-hour lab. No prerequisite: Lec 2, Lab 2, Cr 3.

55. Materials in Agricultural Engineering—Introduction to physical and rheological properties of structural and biological material useful in agricultural design and application. Prerequisite: Ps 2 or permission of instructor. Rec 2, Lab 2, Cr 3.

80. Senior Seminar—Problems associated with professionalism and the first employment of the young agricultural engineer. Rec 1, Cr 1.

81. Departmental Seminar—Presentation and discussion of current developments and problems that affect agricultural engineering and agricultural engineers. Rec 1, Cr 1.

82. Introduction to Agricultural Engineering—An introduction to engineering experimentation involving biological material. Primarily for sophomores majoring in agricultural engineering. Rec 1, Lab 2, Cr 2.

83. Special Problems in Agricultural Engineering—Independent study. Cr Ar.

84. Special Topics in Agricultural Engineering—Studies are offered in hydraulic power systems, surveying techniques and machine shop equipment. Also available as a five week block course. Transcript will show area of study. Cr Ar.

LSA 115. Cooperative Education—Practical experience for the undergraduate student, combining work in a business firm or public agency with academic courses and supervision. Opportunity for student to gain experience, to integrate classroom learning with job performance, and to develop future placement possibilities. Prerequisite: Junior standing and permission. Cr 1-16 (Pass/Fail).

†***160. Agricultural Machinery***—A design oriented course for engineering majors covering power requirements, capacity, economics of agricultural machines. Functional analysis is an integral part of the course. Laboratory and field testing is carried out. Prerequisite: Me 51. Rec 2, Lab 3, Cr 3.

162. Fluid Power—Fluid power fundamentals and theory, analysis and operation principles of components, design techniques and circuit analysis for hydraulic systems, introduction to pneumatic systems. Prerequisites: Me 33 and Me 59 (or Ce 50) or permission. Rec 2, Lab 3, Cr 3.

†***163 Farm Structures Design***—Structural design and environmental control in production, processing and storage buildings; consideration of functional requirements, system economics and methods and materials of construction. Prerequisite: Me 51. Rec 2, Lab 3, Cr 3.

†***164. Instrumentation and Control Systems***—Analysis of dynamic measurement and control systems, temperature, force, moisture content, strain, and fluid flow measurements involving physical and biological systems. (Fall semester) Prerequisite: Ps 2 and Ms 28 or permission. Lec 2, Lab 2, Cr 3.

165. Soil and Water Engineering—Rainfall and runoff, flood control, land clearing techniques, and water resources engineering. Design of erosion control structures, small earth dams and farm reservoirs, drainage and irrigation systems. Prerequisite: Ce 50 or Me 59. Rec 3, Lab 3, Cr 4.

‡***167. Agricultural Power***—Tractor power units, construction, operating principles, testing and rating; vehicle mechanics as applied to tractors and other cross country vehicles; farm electrification; new energy sources and applications for agriculture. Prerequisite: Me 33. Rec 2, Lab 3, Cr 3.

‡***169. Agricultural Process Engineering***—Analysis and design of unit operations such as size reduction, separation, heating, drying, refrigeration, and their applications to agricultural processing. Prerequisite: Me 33 and Me 59 or Ce 50 (may be taken concurrently). Rec 2, Lab 3, Cr 3.

173. Forest Roads and Structures—Design, construction and maintenance of improvised road systems and bridges. Road-vehicle interactions. Design and construction of light buildings for forest and recreational use. Prerequisite: Ps 1 or Ps 6. Rec 2, Lab 3, Cr 3.

174. Forest Power and Machinery—Power sources for forest operations, construction principles, testing and rating. Design and use of forest machinery; power requirements, selection, management and engineering aspects of machinery systems design. Prerequisite: Ps 1 or Ps 6. Rec 2, Lab 3, Cr 3.

250. Simulation of Biological and Physical Systems—An introduction to modeling and simulating real life, time dependent, continuous systems. Examples from physiology, economics, water management, plant growth, population dynamics, and other fields are simulated on the digital computer using Fortran and 360/CSMP. Prerequisite: Ms 26 or equivalent, elementary Fortran. Lec 3, Cr 3.

380. Graduate Seminar—Rec 1, Cr 1.

383/384. Problems in Agricultural Engineering—Cr Ar.

399. Graduate Thesis—Cr Ar.

Taught in Continuing Education Only (CED)

LSA 141. Energy and Man—The energy crisis. The extent of our demand for energy and the forms in which we need it. Methods of matching sources to demands, with a view to insuring continuous availability and conserving our environment. Lec 2, Rec 1, Cr 3. (C.E.D. only).

LSA 142. Metals and Man—The influence of metals technology on man's existence. A practical look at testing, properties manipulation, fabrication, and utilization of metals is included. Production and processing methods. Environmental effects. Welding instruction available at the student's option. No prerequisite. Lec 3, Cr 3. (C.E.D. only).

LSA 143. Shelter and Man—Examination of mankind's efforts to develop shelter. Topics will include determination of a family's housing needs, selection and utilization of a home site, selection of materials, structural design of framing components, heating systems, insulation, water systems, electrical systems, and estimations of construction costs. Lec 3, Cr 3. (C.E.D. only).

AGRICULTURAL AND RESOURCE ECONOMICS

Professors Delphendahl (Chairman), Dunham, Metzger, Ploch, Pullen, Wing; Associate Professors Johnston, King, Micka (Cooperating); Assistant Professors Kezis, Skinner, White; Lecturer Cook.

The Department of Agricultural and Resource Economics offers a curriculum leading to the B.S. degree in agricultural and resource economics, with emphasis in agricultural business management and marketing, and resource and production economics. An option in sociology of rural life is also available. The department's program is designed to develop abilities to handle managerial responsibilities in the economic and social aspects of the food and fiber industries and related fields, and the development of human and natural resources. The program provides a broad education in agricultural business, economics, and rural sociology.

Areas of instruction include the business and economic aspects of production, with emphasis on the economic use and management of capital, labor, and land resources; the business aspects of marketing, with emphasis on pricing, financing, merchandising, and consumption; the economics related to development of area resources. Also stressed are the social and human factors associated with food production, processing, distribution, consumption, and community development. In addition, training is complemented by a comprehensive, integrated program of courses in the life sciences, other social sciences, communication, arts and humanities.

Employment opportunities exist in sales, service, research and management positions, with food, agricultural, and other businesses such as manufacturing and processing firms, wholesale and retail distribution firms, insurance and credit agencies, cooperatives, feed, fertilizer, and farm supply companies. Graduates also are frequently employed by federal and state governments, by colleges and universities. Opportunities for students majoring in Sociology of Rural Life include employment as case workers in social service organizations, as camp directors, and community organizers and planners.

The department participates in offering an interdisciplinary curriculum leading to the B.S. degree in Natural Resources and the B.S. degree in Recreation and Parks. (See Index). The curriculum in Natural Resources consists of a core program emphasizing the physical, biological, and earth sciences, and the humanities and social sciences, and an option in land use planning.

The Department also offers an option in Agricultural and Natural Resource Education. See Index.

Curriculum for Agricultural and Resource Economics
(Except Rural Sociology Option)

Required Courses		Credit Hours	Minimum Degree Hours Required
A. ORIENTATION		0	0
B. BASIC SCIENCES			11
Bio 1	Basic Biology	4	
	Electives*	7	
C. COMMUNICATIONS			6
Eh 1	College Composition	3	
SC 3	Fundamentals of Public Speaking	3	
D. HUMANITIES AND SOCIAL SCIENCES			15
Eh 17	Advanced Professional Exposition	3	
SC 57	Business and Professional Speaking	3	
	Electives**	9	

E. LIFE SCIENCES AND AGRICULTURE			12
IDL 19	Ecology	3	
	Electives**	9	
F. BUSINESS AND ECONOMICS			15
Ba 9	Principles of Accounting I	3	
Ba —	Elective	3	
Ec 10	Principles of Economics	3	
Ec 132	Macroeconomics	3	
Ec 153	Money and Banking Select One		
Ec 173	Economics Analysis	3	
G. AGRICULTURAL AND RESOURCE ECONOMICS			32
IDL 24	Sociology of Rural Life	3	
ARE 154	Introduction to Production Economics	3	
ARE 159	Agricultural Business Management	3	
ARE 165	Food and Fiber Marketing	3	
ARE 168	Price Analysis and Forecasting	3	
ARE 171	Land Resource Economics	3	
ARE 186	Government Policies Affecting Rural America	3	
ARE 194	Seminar	2	
	Electives (Any ARE courses except ARE 48)	9	
H. MATHEMATICS AND STATISTICS			12
Ms 13 & 14	Math for Business and Economics (or Ms 26)	4	
Ms 15	Intro. to Statistics for Business and Economics	3	
CS 81		3	
I. FREE ELECTIVES			17(20)
Any course in the University for which the student is qualified			
	Minimum Degree Hours for Graduation		**120**

*Choose from the following fields: Botany, Microbiology, Biochemistry, Chemistry, Geology, Mathematics, Physics, Zoology.
**Choose from the following fields: Agricultural and Resource economics, Anthropology, Art, Economics, Education (EdB 2, EdB 3, EdB 4), English, History, Journalism (Jr 22, Jr 75), Language, Literature, Modern Society, Music, Philosophy, Political Science, Psychology, Sociology, Speech.
***Any course in the College of Life Science & Agriculture except ARE courses.

Curriculum for Sociology of Rural Life Option

Required Courses		Credit Hours	Minimum Degree Hours Required
A. ORIENTATION		0	0
B. BASIC SCIENCES			11
Bio 1	Basic Biology	4	
	Electives*	7	
C. COMMUNICATIONS			6
Eh 1	College Composition	3	
SC 3	Fundamentals of Public Speaking	3	
D. HUMANITIES AND SOCIAL SCIENCES			15
Eh 17	Advanced Professional Exposition	3	
SC 57	Business and Professional Speaking	3	
	Electives**	9	
E. LIFE SCIENCES AND AGRICULTURE			12
IDL 19	Ecology	3	
	Electives***	9	
F. BUSINESS & ECONOMICS & AGRICULTURAL & RESOURCE ECONOMICS			11
ARE 48	Principles of Agricultural Economics		
or			
Ec 10	Principles of Economics	3	

ARE 71	Economics of Environmental Quality	3	
or			
ARE 186	Gov't Policies Affecting Rural America	3	
ARE 194	Seminar	2	
	Elective (any ARE course)	3	
G. RURAL SOCIOLOGY, SOCIOLOGY AND PSYCHOLOGY			30
IDL 24	Sociology of Rural Life	3	
IDL 124	Contemporary Rural Problems	3	
IDL 129	The Individual and the Community	3	
ARE 122	Human Factors in Resource Development	3	
Py 1	General Psychology	3	
Py 130	Social Psychology	3	
Sy 3,4/			
Ay 1,2	Introduction to Sociology or Anthropology	6	
	Electives (Ay, Py, Sy)	6	
H. MATHEMATICS AND STATISTICS			15
	(Two semesters of mathematics, level to be determined by performance on mathematics qualification test)		
Ms		6	
Sy 180	Logic of Sociology Inquiry	3	
Sy 191	Practicum in Sociology Research	3	
Cs 81	Intro to Computer Science	3	
I. FREE ELECTIVES			23
	Minimum Degree Hours for Graduation		**120**

*Choose from the following fields: Botany, Microbiology, Biochemistry Chemistry, Geology, Mathematics, Physics, Zoology.

**Choose from the following fields: Agricultural and Resource economics, Anthropology, Art, Economics, Education (EdB 2, EdB 3, EdB 4), English, History, Journalism (Jr 22, Jr 75), Language, Literature, Modern Society, Music, Philosophy, Political Science, Psychology, Sociology, Speech.

***Any course in the College of Life Sciences & Agriculture except ARE courses.

Courses in Agricultural and Resource Economics (ARE)

48. Principles of Agricultural Economics—Economic principles applied to the business firm. Production, marketing, use of human and natural resources, and governmental policy. Rec 3, Cr 3. Not open to ARE majors, except Rural Sociology option.

71. Economics of Environmental Quality—Economic aspects of environmental issues. Maintenance of quality of natural resource base. Economic implications of private and public patterns of environmental use. Prerequisite: none. Rec 3, Cr 3.

LSA 115. Cooperative Education—Practical experience for the undergraduate student, combining work in a business firm or public agency with academic courses and supervision. Opportunity for student to gain experience, to integrate classroom learning with job performance, and to develop future placement possibilities. Excludes prior experience. Prerequisite: ARE students with junior standing and permission. Cr 1-8. (Pass/Fail).

154. Introduction to Production Economics—Application of economic relationships; principles and problems of resource allocation at the firm level. Prerequisite: Ec 10 or ARE 48. Rec 3, Cr 3.

159. Agricultural Business Management—Management principles and procedures applicable to agricultural businesses. Prerequisite: ARE 48 or Ec 10. Rec 3, Cr 3.

IDL 161. Park Planning and Design—Basic planning and design principles of space, scale and circulation applied to recreation areas and park facilities with special emphasis on visitor use. Prerequisite: junior, senior standing or permission. Field trip fee required. Rec 2, Lab 2, Cr 3.

IDL 162. Recreation and Park Management—Fundamental management considerations related to the administration of recreation and park programs. Rec 3, Cr 3.

165. Food and Fiber Marketing—Economic principles applied to marketing structures, services and agencies; analysis of costs and efficiencies; impact of industry organization and government. Prerequisite: Ec 10 or permission of instructor. Rec 3, Cr 3.

168. Price Analysis and Forecasting—Analysis and measurement of factors affecting supply, demand, and elasticity, their relation to the level and changes of market prices, and use of quantitative techniques in forecasting. Prerequisite: Ec 173, Ms 15, or permission of instructor. Rec 3, Cr 3.

171. Land Resource Economics—Principal economic and institutional factors affecting man and his use of land and resources; supply, demand and future requirements; economics of resource allocation, functioning of the land market, benefit cost analysis; planning for more efficient use of resources. Prerequisite: Ec 10, Rec 3, Cr 3.

174. Land Use Planning—Principles of planning for coordinated use and development of the land resource base. Survey of emerging concepts and problems that relate to land use policies and control measures. Emphasis on economics, institutional, and social parameters and limiting factors. Prerequisite: ARE 171 or permission. Rec 3, Cr 3.

186. Government Policies Affecting Rural America—Analysis of policies and programs affecting rural America; policies affecting agriculture and the food industry, rural poverty and natural resource management. Prerequisite: Ec 10 or ARE 48 or permission. Rec 3, Cr 3.

194. Seminar—Discussion of current economic and social problems. Prerequisite: seniors and graduate students. Rec 2, Cr 2.

197.198. Independent Studies—Analysis of current problems in agricultural and resource economics, rural sociology, and community development. Prerequisite: permission of instructor. Cr 1-3.

ARE 218. Mathematical Economics Techniques—Advanced economic theory presented mathematically. Prerequisite: Permission of instructor. Rec 3, Cr 3.

217. Research Methods in Agricultural and Resource Economics—Nature of economic and social inquiry; scientific method; formulation of hypotheses; empirical techniques; emphasis on survey methodology and use of computer software for data analysis. Prerequisite: Ms 19 or permission of instructor. Rec 3, Cr 3.

399. Graduate Thesis—Cr Ar.

IDL 230. Econometrics—An introduction to economic concepts and relationships expressed in statistical terms. Major emphasis will be given to economic models related to demand, supply, production and cost function; input-output analysis and other models will also be considered. Prerequisite: Ms 15 and 16, Ec 173 or permission of instructor. Rec 3, Cr 3.

227. Community Development-Principles—Sociological and psychological principles related to the community development processes. Development of an understanding of interpersonal dynamics internal to social systems and the development of change agent roles. Prerequisite: 6 hours in sociology plus inroductory social psychology, or permission of instructor. Cr 3.

228. Community Development-Applications—Introduction and practice of skills and strategies needed by community development practitioners including such areas as community development process, group dynamics and group problem solving. Use of teaching techniques includes panels, discussions, field trips, class member presentations and group dynamics. Prerequisite: ARE 250 or permission. Rec 3, Cr 3.

254. Production Economics—The principles of optimum resource allocation applied to the agribusiness firm. The use of advanced techniques as tools for attaining optimum resource allocation. Prerequisite: permission. Rec 3, Cr 3.

265. Marketing Theory and Concepts in Agri-Business—Economic Theory underlying the policies of agricultural marketing firms; study of current marketing problems and market practices for selected commodities and segments of the agri-business sector of the U.S. economy. Prerequisite: ARE 165, Ec 173, or permission. Rec 3, Cr 3.

272. Resource Use and Economic Growth—Resource utilization and economic growth in retrospect. Importance of resources. Theories measurements of economic development. Planning for resource development. Prerequisite: ARE 171 or permission of instructor. Rec 3, Cr 3.

277. Economics of Public Choice—Analysis of economic systems as mechanisms for collective action. Emphasis on the role of property rights in natural resource utilization. Focus on the market system; reasons for market failure in resource allocation and income distribution; and analysis of extra-market and non-market alternatives for collective action. Prerequisite: Ec 10 or permission. Rec 3, Cr 3.

293.294. Graduate Seminar—Analysis of current problems in community development, resource use, management. Emphasis on economic and social effects. Problem areas vary from semester to semester. May be repeated for a total of 6 credits. Prerequisite: permission. Cr 1-3.

297.298. Independent Studies—Analysis of current problems in agricultural and resource economics, rural sociology, and community development. Maximum of six credits. Prerequisite: permission. Cr 1-3.

329. Practicum in Community Development—Under direction of a staff member, each student has an active role in a community development project. Learning is enhanced through scheduled group seminars and preparation of progress reports. Prerequisite: ARE 250, 251. Cr 6.

399. Graduate Thesis—Cr Ar.

Courses in Sociology of Rural Life (IDL and ARE)

IDL 24. Sociology of Rural Life—Significance of rural society in American culture. The impact of forces of change, including population movement. The significance of changes in the social systems of community, family, religion, education, and stratification. Rec 3, Cr 3.

ARE 122. Human Factors in Resource Development—Methods of applied social change in community and development. Community and individual resistances to, and acceptance of, development programs. Consequences of development for community social systems. Development as an interactive force in the community. Prerequisite: IDL 24 or permission. Rec 3, Cr 3.

IDL 124. Contemporary Rural Problems—A problem-oriented, class participation course focusing on the trends in contemporary rural society. Rural population displacement and mobility, poverty, industrialization; consequent changes in occupational compositions, and related changes. Prerequisite: IDL 24 or equivalent. Rec 3, Cr 3.

IDL 129. The Individual and the Community—Analysis of the functioning and structure of the community. Emphasis on ways in which individuals and groups are affected by community dynamics. Community project. Prerequisite: IDL 24 or Sy 126 or permission. Rec 3, Cr 3.

Graduate Work in ARE and in Community Development

The M.S. degree in agricultural and resource economics is offered with opportunity for study in marketing, production economics, resource economics, and sociology of rural life. The M.S. degree in community development is offered with opportunity for study of the principles and applications of community development.

Master of Professional (M.P.S.) degrees in agricultural and resource economics and in community development are offered. Candidates for these degrees are not required to write a thesis. They need not meet the full-time residence requirement.

Students are encouraged to develop broad interdisciplinary programs combining departmental area requirements and approved electives. Candidates are encouraged to elect graduate level courses in the Department of Agricultural and Resource Economics and other departments and colleges of the University.

Full descriptions of these graduate degree programs are presented in the Graduate School Catalog.

ANIMAL AND VETERINARY SCIENCES

Professors Musgrave (Chairman), Bull, Gerry, Gershman, Gibbs, Hawes, Leonard, Muir, Wolford; Associate Professors Bayer, Harris, Hawes; Assistant Professors Congleton, Goater, Kling, McLaughlin, Stokes; Instructor Opitz; Lecturer Fox, Myers; Visiting Professors Hurvitz, Kay, MacEwen, Nesbitt; Visiting Associate Professor Hayes; Visitng Assistant Professors Crawford, Fox, Herron, Kingsborough, Lawson, Manfra, Meierhenry, Randolph, Schrader, Taylor; Visitng Instructors Fine, Prata

The Animal Sciences curriculum is designed to provide a broad biological training as well as a thorough understanding of the anatomy, behavior, breeding, disease, genetics, management, nutrition and physiology of large animals, poultry and laboratory animals.

Because a basic knowledge in animal sciences is fundamental to successful work in many job situations, the curriculum offers a wide choice of electives in order that students may adapt their courses of study to meet special professional interests or needs. Through the proper use of

options, students can prepare for admission to graduate school or veterinary college, teaching sciences in secondary schools, pursuing technical sales and service work in the animal and poultry industries, careers as laboratory animal technicians, or developing animal production enterprises such as dairy, poultry, or livestock farming.

Courses in Animal Health are offered to support the curriculum in the department and the curriculum in Wildlife Management. They also serve as elective opportunities for students in other agricultural and life sciences, and in other colleges. This department also administers the Pre-Veterinary Science program and provides an opportunity for students to be certified to teach high school biology and agriculture. (See Agriculture and Natural Resource Education.)

Superior students should consider continuing their studies at the graduate level. The Department of Animal and Veterinary Sciences offers the master of science degree in animal science for a program of study in animal nutrition, behavior, health, physiology, management, or breeding. The doctor of philosophy degree may be earned in animal nutrition.

Basic Core Curriculum and Options for the B.S. Degree in Animal and Veterinary Sciences

(Effective for all incoming freshman & transfers as of Fall 1980)
See Freshman Programs Section

BASIC CORE CURRICULUM FOR ALL OPTIONS

		Credit Hours	Minimum Degree Hours Required
A. BASIC SCIENCE COURSES			30/31
Bio 1	Basic Biology	4	
Zo 4	Animal Biology	4	
Ch 11/12	General Chemistry	8	
Bc 21	Organic Chemistry	4	
Zo 177	Animal Physiology	4	
One Course from Ms19, Cs81, Ms22 or Ms26		3/4	
FS 101	Food Processing Industry/Principles & Problems	3	
B. ANIMAL SCIENCE COURSES			40
ANV 45	Animal Science	3	
ANV 46	Dairy Cattle Technology	3	
ANV 47	Equine Science	3	
ANV 48	Livestock Management	3	
ANV 60	Animal Genetics	3	
ANV 63	Career Seminar	1	
ANV 74	Senior Topics	1	
ANV 85	Poultry Technology	3	
ANV 137	Animal Diseases	3	
ANV 155	Animal Nutrition	3	
ANV 156	Applied Animal Feeding	4	
ANV 161	Animal Breeding	3	
ANV 172	Animal Endocrinology	3	
ANV 180	Physiology of Reproduction	4	
Possible Substitutes:			
Bc7/8 for Ch 11/12 in special circumstances			
Ch 151/152/161/162 for Bc 21			
ANV 36 for Zo 177			
C. COMMUNICATIONS COURSES			6
Eh	Written	3	
Sc	Oral	3	
D. HUMANITIES AND SOCIAL SCIENCE			15
Ec 10 or ARE 48 is required		3	
E. CAREER ADVANCEMENT ELECTIVES			12
At least four approved courses in area of students' interest (see subsequent sections for specific options)			
F. GENERAL ELECTIVES			16/17
G. OTHER - LSA 1 - ORIENTATION			0
		Total	120

OPTIONS

A. ANIMAL SCIENCE GENERAL OPTION—offers maximum minor possibilities particularly for agri-business oriented students - recommended agri-business courses include:

ARE 154	Introduction to Production Economics	3
ARE 159	Agricultural Business Management	3
ARE 165	Food and Fiber Marketing	3
Ba 9	Principles of Accounting	3

B. ANIMAL SCIENCE GRADUATE SCHOOL OPTION—recommend following additional courses:

Ms 26	Analytical Geometry & Calculus	4
Ch 151/152 161/162	Organic Chemistry	10
Zo 133	Comparative Anatomy	4
Mb 127/128	General Microbiology	5
Ch 140	Quantitative Analysis	4
Ps 1a/Ps 2a	General Physics	8
Bc 161	Advanced Biochemistry	4

C. ANIMAL SCIENCE PREVETERINARY OPTION—see page

D. ANIMAL SCIENCE LABORATORY OPTION—recommend following additional courses:

Zo 133	Comparative Anatomy	4
Mb 127/128	General Microbiology	5
Ps 6	Essentials of Physics	5
Ch 140	Quantitative Analysis	4
Bc 122	Biochemistry	4
Mb 152	Pathogenic Bacteriology & Serology	4
Mb 176	Virology	4
Zo 152	Animal Microtechnique	3

E. EDUCATION OPTION—Students have the opportunity to schedule courses in the College of Education which will allow certification to teach in primary and secondary schools (including biology and agriculture). See index, Agricultural and Natural Resource Education.

F. MINOR POSSIBILITIES FOR ANIMAL SCIENCE MAJORS—

Courses in Animal and Veterinary Sciences (AnV)

36. Physiology of Domestic Animals—A basic core in the physiology of domestic mammals and birds. Gross and histological features of animal systems involved in major physiological processes, meat uses, and disease. Prerequisite: Zo 4 or equivalent. Lec 2, Lab 2, Cr 3.

IDL 43. (P/AnV) Tropical Agriculture—The characteristics and problems of the soils, plants, and animals of the tropics. Programs and methods for stimulating their potential productivity will be explored. Course same as P 43. Lec 3, Cr 3.

45. Animal Science—Fundamental principles of the animal sciences, including animal genetics, breeding systems, the physiology of reproduction, animal nutrition and the physiology of lactation. Lec 3, Cr 3.

46. Dairy Cattle Technology—The application of breeding, feeding, housing, selection, care, records, breed association programs and recent research findings to herd management. Laboratory devoted to problems in and techniques of dairy cattle management. Field trip fee $6. Prerequisite: AnV 45. Lec 2, Lab 2, Cr 3.

47. Equine Science—Principles of equine science, including breeds, breeding, conformation, nutrition, management, unsoundness, health program, selection, housing, and training. Lec 3, Cr 3.

48. Livestock Management—The selection, breeding, feeding, care and management of beef cattle, sheep, and swine. Field trip fee $9. Prerequisite: AnV 45. Lec 3, Cr 3.

51. Horsemanship—Instruction in equitation under the supervision of riding instructor (limited number of students). Courses can also be taken as an elective in Physical Education. A fee of $80 per semester per student is charged. Lab 2, Cr 1.

60. Animal Genetics and Breeding—The principles of genetics. The transmission and expression of hereditary factors in animals. Prerequisite: Zo 4. Lec 3, Cr 3.

63. Career Orientation—Discussion and evaluation of the areas of animal, dairy, poultry and veterinary sciences; emphasis on requirements, employment opportunities, professional associations, and professional literature. Rec 1, Cr 1.

IDL 65. Meat Technology—The basic science of meat and meat processing, packing house methods and cutting of meat. Lec 2, Lab 2, Cr 3.

74. Senior Topics—Preparation and presentation of papers dealing with research in the animal and veterinary sciences. Evaluation of current literature in the animal and veterinary sciences. Senior students. Rec 2, Cr 1.

85. Poultry Technology—The science of the biology, breeding, feeding, incubation, and diseases of the domestic fowl; and the application of housing, management, and business practices of the table egg, hatching egg, and broiler industries. Field trips are arranged to acquaint students with industry. Field trip fee $8. Prerequisite: juniors and seniors. Lec 2, Lab 2, Cr 3.

LSA 115. Cooperative Education—Practical experience for the undergraduate student, combing work in a business firm or public agency with academic courses and supervision. Opportunity for student to gain experience, to integrate classroom learning with job performance, and to develop future placement possibilities. Prerequisite: junior standing and permission. Cr 1-16 (Pass/Fail).

137. Animal Diseases—Introduction to the study of disease in animals. Studies on the courses, pathology and control of diseases of domestic animals. AnV 36, Zo 177, permission. Lec 3, Cr 3.

144. Diseases and Parasites of Wildlife—Known infectious and parasitic diseases of game and fur-bearing animals, zoonosis, emphasizing preventive and control measures and practice in autopsy and diagnostic techniques. Wildlife majors. Lec 2, Lab 2, Cr 3.

155. Animal Nutrition—Principles of nutrition, methods of experimentation and discussion of nutritional balances. Prerequisite: Zo 4, Ch 12, Bc 21 or equivalent. Cr 3.

156. Applied Animal Feeding—Nutrient requirements of livestock and avian species. The nutritive value and characteristics of feedstuffs. Methods of formulating balanced nutrient intakes. Prerequsite: AnV 155. Lec 3, Lab 2, Cr 4.

161. Advanced Animal Breeding—The inheritance of the commercially valuable characteristics of animals. Mating systems and their effects. Progency testing, selection indices and other methods to incease intensity and accuracy of selection. Prerequisite: AnV 60 or equivalent. Lec 3, Cr 3.

168,169. Independent Study in the Animal Sciences—An in-depth study into a specific area to be approved by the staff advisor at time of registration. (1) anatomy, (2) behavior, (3) breeding, (4) disease, (5) management, (6) nutrition, (7) physiology. Not more than five credit hours will be permitted in this course toward graduation. Prerequisite: AnV 45 or permission. Cr Ar.

172. Endocrinology—The animal endocrine system and functional relationships of each of the endocrine glands to growth, reproduction and lactation. Prerequisite: Zo 177 (or AnV 36 with permission). Lec 3, Cr 3.

180. Physiology of Reproduction—Comparative development and normal and abnormal functions of reproduction and lactation by species, of all domestic animals. Prerequisite: Zo 177 (or AnV 36 with permission). Lec 3, Lab 2, Cr 4.

201. Monogastric Nutrition and Physiology—Structure of the monogastric gastrointestinal tract and its functions discussed. Details of digestive absorption and secretion of digestive glands emphasized. The utilization of energy, proteins, fats, carbohydrates, vitamins and minerals. Prerequisite: Zo 177, ANV 155, ANV 156, Bc 122 or equivalent courses. Lec 3, Cr 3.

202. Ruminant Nutrition and Physiology—Ruminant metabolism will be explored from both the rumen function and host metabolism aspects. Topics will include the anatomical and physiological development of the rumen and other physiological factors related to rumen function. The utilization and metabolism of energy, proteins, fats, carbohydrates, vitamins and minerals. Prerequisite: Zo 177, ANV 155, ANV 156, Bc 122 or equivalent courses. Lec 3, Cr 3.

203. Advanced Animal Pathology—General and systemic animal pathology viewed as physiological and morphological dysfuntions. Emphasis on the basic principles of the disease process with reference to a variety of different types of etiological agents. Prerequisites: Zo 177, ANV 137, ANV 155, Bc 122 or equivalents. Lec 3, Cr 3.

204. Research Methods in Animal Science I—Practical experience in nutritional research techniques for the determination of nutrient balance, rates of passage, and indirect animal colorimetry. Prerequisites: ANV 155, ANV 156, Bc 122, CH 140 or equivalent courses. Lab 8, Cr 4.

205. Research Methods in Animal Science II—Methods of studying *in vivo* and *in vitro* metabolism in ruminant and monogastric animals. Particular emphasis will be placed on gastrointestinal surgical techniques for experimental procedures to study physiological responses. Prerequisites: ANV 201, ANV 202 or equivalent courses. Lab 8, Cr 4.

363.364. Graduate Seminar in Animal Science—Cr 1.

390. Graduate Research in Animal Science—Cr Ar.

399. Graduate Thesis—Cr Ar.

PLANT AND SOIL SCIENCES

Associate Professor Swasey (Chairman); Professors Eggert, Glenn, Holyoke, Langille, Murphy, Struchtemeyer; Associate Professors Erhardt, Goltz, Hepler, Ismail, Littlefield, Mitchell, Smagula, Wave; Assistant Professors Hall, Koons, Reeves; Associate Soil Scientist Rourke; Assistant Agronomist Stafford; Faculty Associates Benoit, Czapowskyj, Ferwerda, Grant, Joslin, LaFlamme; Assistant Chemist Eggebrecht

The Department of Plant and Soil Sciences provides a well-balanced educational program for students interested in the study of plants or soils, or in an integrated study of both fields. The program provides training for students in the basic sciences as well as the opportunity to develop knowledge in areas of production agriculture as applied to local conditions, the utilization of our soil resource base, and the utilization of landscape materials. Included in the curriculum are fundamental courses in both the plant and soil sciences, courses in the student's area of specialization, and courses from other departments and colleges which combine to achieve a balanced background.

Students not majoring in Plants and Soil Sciences may obtain a minor in either Plants or Soils.

Upon meeting the requirements established by the University and the department, students will receive a B.S. degree in plant and soil sciences. Training received will qualify the students for careers in teaching, extension work, production and service functions for industry. Soil Conservation Service and other related government agencies, farming, landscaping, consulting, inspections, communications and sales. The department also offers an opportunity for students to teach high school agriculture. (See Agriculture and Natural Resource Education.)

Students who are well qualified and are interested in doing graduate work should plan early to go beyond the B.S. degree. Graduate programs at the M.S. and Ph.D. levels are available and qualified students should be encouraged to continue their education for an advanced degree.

Curriculum in Plants or Soils

Required		Credit Hours	Minimum Degr Hours Requir
A. ORIENTATION			0
LSA 1	Orientation	0	
B. BASIC SCIENCES AND MATHEMATICS			24.4
Bio 1	General Biology (Study sections 1-7, 12)	4.4	
Ch 11 & 12	General Chemistry	8	
Ms 26	Analytic Geometry & Calculus	4	
Ps 1a & 2a	General Physics	8	
C. COMMUNICATIONS			9
Eh 1	College Composition	3	
Eh 17	Adv. Prof. Exposition	3	
SC 3	Fund. of Public Speaking	3	

D. HUMANITIES AND SOCIAL SCIENCES			15
E. PLANT OR SOIL SEQUENCE			
Plant Sequence			71.6
BC 21	Organic Chemistry	4	
BT 153	Plant Physiology	4	
BT 154	Intermediate Plant Physiology	4	
BT 157	Plant Pathology	4	
En 26	Intro. Entomology	4	
P 21	Crop Science	3	
P 22	Crop Management	4	
P 163	Bioclimatology	3	
P 166	Plant Propagation	3	
P/S 173&174	Seminar	2	
S 2	Soil Science	4	
S 151	Soil fertility	3	
Zo 163	Principles of Genetics	4	
	Electives (see below)		

Listed below are some recommended electives for the Plant Sequence:

ARE 48	Prin. of Agr. Economics	3	
Bio 51	Inter. of Bio. Statistics	3	
Bt 2	The Plant Kingdom	4	
Bc 122	Biochemistry	4	
Bt 135	Plant Anatomy	4	
Bt 164	Taxonomy of Vascular Plants	4	
Mb 127, 128	Gen. Microbiology and Lab	5	
P 30	Ornamental Horticulture	3	
P 31	Landscape Plant Materials	3	
P 33	Greenhouse Management	4	
P 34	Agrostology	3	
P 35	Art of Home Landscaping	3	
P 143	Prin. of Weed Control	3	
P 121, 122	Advanced Crop Management	3	
P 201	Plant Growth Regulators	3	
P 266	Post Harvest Physiology	3	
Soil Sequence			71.6
BC 21	Organic Chemistry	4	
BT 153	Plant Physiology	4	
*BT 154	Inter. Plant Physiology	4	
Gy 1	Aspects of Natural Environment	4	
Gy 241	Glacial Geology	3	
*Mb 127	Gen. Microbiology	3	
P 21	Crop Science	3	
P 163	Bioclimatology	3	
P/S 173&174	Seminar	2	
S 2	Soil Science	4	
S 151	Soil Fertility	3	
S 152	Soil Taxonomy	3	
S 153	Soil Morphology and Mapping	3	
S 154	Chem. Prop. of Soils	4	
S 156	Phys. Prop. of Soils	3	
		46-47	
Electives			24.6-25.6

**Either course

Listed below are some recommended electives for Soil Sequence.

AE 35	Soil and Water Control	3
AE 165	Soil and Water Engineering	3
ARE 48	Prin. of Agri. Economics	3
Are 171	Land Resource Economics	3
At 1	Basic Drawing	3
Ba 9	Principles of Accounting	3
Bio 51	Interpretation of Biological Statistics	3

Bt 157	Plant Pathology	4
Ch 140	Quant. Analysis	4
Ec 10	Principles of Economics	3
En 26,26L	Int. Entomology & Lab	4
P 22	Crop Management	4
P 143	Prin. of Weed Control	3
Minimum Degree Hours Required for Graduation		**120**

Soils Courses (S)

2. Soil Science—The chemical, physical and biological properties of soil. Also considers origin, management and interrelationships of soils to plant growth. Prerequisite: Ch 9, 11 or Bc 7. Rec 3, Cr 3 or Rec 3, Lab 2, Cr 4.

3. Forest Soil Science—Fundamentals of soil science including the study of development, properties, and management of soils and the interrelationships of soils to forest growth. Prerequisite: Ch 9 or 11. Rec 2, Lab 2, Cr 3.

5. Soil Judging—Methods of describing and interpreting soil properties for urban, agricultural, recreational and other uses are developed. Various landscapes will be judged. Soil judges will compete in the annual regional soil judging competition. A course fee of $100 for each student. Prerequisites: S 2 or S 3 Rec & Lab 1, Cr 1.

50. Soil and Water Conservation—Management of soil and water resources in accordance with the multiple use concepts. Problems of erosion and water pollution are also dealt with. Rec 2, Cr 2.

52. Land Use Planning-Soil Aspects—A consideration of basic soil characteristics and properties as they influence land use and aid regional planning. Rec 2, Cr 2.

LSA 115. Cooperative Education—Practical experience for the undergraduate student, combining work in a business firm or public agency with academic courses and supervision. Opportunity for student to gain experience, to integrate classroom learning with job performance, and to develop future placement possibilities. Prerequisite: junior standing and permission. Cr 1-16 (Pass/Fail).

IDL 140. Seminar in Quaternary Studies—A multidisciplinary seminar concerned with selected areas of study (physical, biological, and anthropological) related to the Quaternary Period. Subject areas will vary each semester; may be taken more than once for credit. (Same as Ay, Bt, Gy, Zo 140). Prerequisite: consent of instructor. Rec 2, Cr 2.

151. Soil Fertility—A study of soil as a source of the essential nutrients needed for plant growth and the properties and use of fertilizers, liming materials, and manures. Prerequisite: S 2 or S 3. Rec 3, Cr 3.

152. Soil Taxonomy—Taxonomy and classification of soils. Prerequisite: S 2 or S 3 and Gy 1 or Gy 241; junior, senior or graduate standing. Rec 2, Lab 3, Cr 3.

153. Soil Morphology and Soil Mapping—Soil profile description and soil map construction taught in an intensive 3 week course. Prerequisites: S 2 or S 3, S 152. Lab 6, Cr 3.

†*154. Chemical Properties of Soils*—Origin and nature of chemical properties of soils and their effect on plant growth and soil management. Prerequisite: S 2 or S 3 and S 151. Rec 3, Lab 3, Cr 4.

‡*156. Physical Properties of Soils*—An intensive consideration of the physical properties of the soil and their effect on plant growth. Prerequisite: S 2 or S 3 and Ps 1a and 2a, and Ms 26. Rec 2, Cr 3.

157.158. Problems in Soils—Opportunity is provided for specialization in specific areas of soil science. Cr Ar.

203. Radiobiology—Principles for the use, detection, and effects of radioisotopes in biological systems. Rec 2, Lab 4, Cr 4.

252. Methods of Spectrochemical Analysis—The theory and practice of colorimetry and absorption and emission spectroscopic methods in quantitative chemical analysis. Prerequisites: Ch 140, Ps 1a, Ps 2a or permission of instructor. Rec 2, Lab 4, Cr 4.

‡*254. Chemistry of Soils*—Composition and chemical transformations in soils, soil-solution equilibria considerations, soil profile development, and ion-exchange pheonema in soils. Prerequisites: S 2, S 151, S 154, and Ch 140. Rec 2, Lab 4, Cr 4.

271. Experimental Design—Principles of research in biological sciences, design of experiments, statistical analyses and interpretation of data. Permission of instructor. Rec 3, Lab 2, Cr 4.

273/274. Graduate Seminar—A presentation of literature reviews, research methodology and research progress before a critical audience of peers and faculty.

399. Graduate Thesis—Cr Ar.

Plant Courses (P)

1. Horticulture—General horticultural principles and practices as related to fruits, vegetables and ornamentals. Special aspects relating to plant propagation, home landscaping, and home gardens. Rec 3, Cr 3.

5. The Home Garden-Vegetables and Fruits—The small scale, intensive culture of the vegetable and fruit plants ordinarily grown in northern gardens. Alternative management and cultural techniques are discussed and evaluated. Rec 3, Cr 3.

21. Crop Science—Application of environmental sciences to growth of agricultural crops. Response of crops to moisture, temperature, light and soil fertility. Effects of weeds, diseases and insect pests. Prerequisite: Bio 1 or permission. Rec 3, Cr 3.

22. Crop Management—Principles and practices in the management of selected agricultural crops and field ornamentals. Includes weekly guest lecturers illustrating major species of the Northeast. Prerequisite: P 21 or permission. Rec 4, Cr 4.

30. Herbaceous Landscape Plants—The principles and practices of growing and using herbaceous garden flowers in the landscape. Emphasis on identification and selection of the plants, and the garden designs in which they are used. Rec 2, Lab 2, Cr 3.

31. Woody Landscape Plants—The study of woody plants suitable for landscape use in New England including their selection, arrangement, planting, and care. Prerequisite: junior or senior standing or permission. Rec 2, Lab 2, Cr 4.

33. Greenhouse Management—The application of plant science to growing ornamental plants in commercial, school, and home greenhouses. Emphasis on specialized cultural techniques, structures, and marketing. Rec 3, Lab 2, Cr 4.

34. Agrostology—The identification, fertilization, mowing, pest control, and soil requirements of grasses suitable for use on lawns, golf courses, athletic areas, cemeteries and parks. Rec 3, Cr 3.

35. The Art of Home Landscaping—The principles of home landscaping as applied to the planning and planting of property in making it a useful and an attractive place to live. Rec 2, Cr 2; or Rec 2, Lab 2, Cr 3.

37. Floral Design: Retail Shop—Demonstrations, work sessions showing the basic practices in a flower shop, taping, wiring, vase arrangements, corsage, wedding and funeral designs. Fresh and dried flowers will be used. Prerequisites: None. Lab 2, Cr 1.

38. Floral Design: Home—Design labs will emphasize the use of flowers in the home. Introducing the basic elements and principles in flower design, the care and storage of cut flowers. Fresh, silk, and dried materials will be used. Prerequisites: None. Lab 2, Cr 1.

IDL 43. (P, AnV) Tropical Agriculture—A consideration of the characteristics and problems of the soils, plants, and animals of the tropics. Programs and methods for stimulating their potential productivity will be explored. Rec 3, Cr 3.

122A.122B. Advanced Crop Management—Basic practices in the production of specific agricultural crops. Students may register for one or more of the following sections. Prerequisite: P 21 or P 22 or permission. Cr 3.

Section 01-Fruits. Scientific principles and practices used in the production of fruit crops. The culture of fruits adapted to the Northeast with emphasis given to apples and blueberries.
Section 02-Vegetables. The important vegetable crops, emphasizing their characteristics and culture with consideration given their adaptation to local soil and climatic conditons.
Section 26-Forages. The production practices important in growing forage grasses, legumes, and silage corn. The principles of forage preservation will also be studied.

135. Landscape Design Problems—The practical and theoretical principles of landscape design as they are applied to common problems. Emphasis is on exposure and awareness in the area of landscape design. Prerequisite: P 31, or P 53L or permission. Rec 2, Lab 2, Cr 3.

143. Principles of Weed Control—Principles and practices of controlling weeds in agricultural crops and in non-crop areas. Emphasis on chemical methods. Functions, equipment and recommendations for herbicides. Prerequisites: Bio 1 and P 21, or permission of instructor. Rec 3, Cr 3.

IDL 161. Park Planning and Design—Basic planning and design principles of space, scale and circulation applied to recreation areas and park facilities with special emphasis on visitor use. Prerequisite: junior, senior RPM majors. Rec 2, Lab 2, Cr 3.

163. Bioclamatology—An introduction to forces governing weather and climate. Interrelationships of atmospheric and biological processes and solutions to problems of plant and animal responses to the microclimate. Prerequisites: PS 1a and 2a and Ms 26. Rec 3, Cr 3.

166. Plant Propagation—Principles and methods involved in the propagation of herbaceous and woody plants by seeds, division, layering, cutting, budding, and grafting. Prerequisite: Bt 153 or permission. Rec 2, Lab 2, Cr 3.

167.168. Problems in Plant Science—Opportunity is provided for specialization in specific areas of plant science. Cr Ar.

173/174. Seminar—Review of literature, problems, and research as related to the areas of plants and soils. Rec 1. Cr 1.

177.178. Advanced Studies in Crop Science (Study Area)—Comprehensive study of basic practices in production of agricultural crops. Discussion of selected readings. Register for one or more of optional areas, including (1) apple production, (2) forage management, (3) potato production, (4) sugar beet culture, and (5) crop breeding. Prerequisite: P 21 or P 22 or permission. Cr 3.

†*201. Plant Growth Regulators*—Concepts and techniques in the study of plant growth and development, with emphasis on phytohormones and synthetic growth substances in relation to economic plants. Prerequisite: Bt 153. Rec 3, Lab 3, Cr 3.

‡*266. Post Harvest Physiology*—Biochemical and physiological processes associated with ripening and keeping quality of harvested plant products. Includes temperature, humidity, growth regulators, types of storage, handling and physiological disorders. Prerequisite: Bt 153 or permission. Rec 2, Lab 2, Cr 3.

273/274. Graduate Seminar—A presentation of literature reviews, research methodology and research progress before a critical audience of peers and faculty. Cr 1.

‡*278. Mineral Nutrition of Plants*—History of plant nutrition, plant composition and function of essential elements, mechanisms of uptake, movement, distribution and selective uptake. Also a list of optional topics chosen by the class which includes: mineral nutrient budgets, mineral nutrition and plant breeding and mineral nutrition and plant ecology. Prerequisite: Bt 153 or permission. Rec 3, Cr 3.

399. Graduate Thesis—Cr Ar.

AGRICULTURAL AND NATURAL RESOURCE EDUCATION PROGRAM

Robert Rhoads, Coordinator

The Agricultural and Natural Resource Education Program, for secondary education teachers, is offered as an option under the following programs of study: Agricultural Mechanization, Agricultural and Resource Economics, Animal and Veterinary Sciences, Forestry, and Plant and Soil Sciences. The professional education courses and non-major agricultural technical courses required are taken as electives in the student's subject matter major. The program permits a student to obtain a professional bachelor of science degree in the subject matter area with an option in Agricultural and Natural Resource Education.

In addition to opportunities in the subject matter major field the graduate is prepared to teach in one or more of the following areas: Agricultural production, Agricultural Supply and Services, Agricultural Mechanics, Agricultural Products, Agricultural and Natural Resources, Forestry, Horticulture, or other agricultural areas.

Teacher certification is obtainable from the Maine Department of Educational and Cultural Services upon successful completion of the program as a teacher of general agriculture and with appropriate agricultural experience as a teacher of vocational agriculture in regional vocational schools.

Students interested in the Agricultural and National Resource Education option should contact the Coordinator located in 100 Winslow Hall as early as possible, preferably by the end of the freshman year.

CURRICULUM FOR OPTION IN AGRICULTURAL AND NATURAL RESOURCE EDUCATION

1. The student will meet all requirements of the subject matter major.
2. Agricultural and Natural Resource Education requirements:

A. Professional Education — 24 credit hours

AE 80	Senior Seminar	1
Py 1	General Psychology	3
EdA 21	Human Dynamics in Education*	3
EdB 2	American School*	3
EdB 4	Teaching Process	3
EdX 172	Workshop in Secondary Education (Principles of Vocational Education)	3
EdM 142	Teaching Science in Secondary School	3
EdM 191	Student Teaching (Required for certification)	6

B. Related technical field requirements — 18 credit hours

A minimum of six credit hours in each of three non-major areas to be selected from an approved list of technical courses.

Agricultural Mechanization
Agricultural and Resource Economics
Animal and Veterinary Sciences
Forestry
Plant and Soil Sciences

Required credit hours for Agricultural Education option — 43

*May be considered as Social Science courses

FOOD SCIENCE

Professor Barden (Chairman): Associate Professors Ramsdell, Slabyj; Associate Chemists Belyea, Bradbury; Associate Food Scientist True; Assistant Professors A. Bushway, R. Bushway; Assistant Chemist Cook; Research Associate Blease; Assistant Food Technologist Work

The Department of Food Science offers courses leading to an option in food science. Emphasis is on application of basic sciences, mathematics and economics to problems of evaluation, prediction, preservation and control of quality of foods during handling, storage, processing, distribution, and preparation for consumption. Ordinarily, the course work in food science occurs in the last two years of study. Students interested in preparing for careers in the food industry should consult with the department chairman regarding specific courses in food science which should be added to their major programs of study.

CURRICULUM FOR OPTION IN FOOD SCIENCE

		Hours	Minimum Degree Hours Required
A. Required Courses			15
FS 101	Food Processing Industry	3	
FS 98	Independent Studies	12	
B. Recommended Courses			
ARE 159	Agricultural Business Management	3	
FN 152	Human Nutrition	3	
FY 4	Statistical Inference in Forest Resources, or comparable course	3	

Courses in Food Science (FS)

IDL 50. Forum on Food—Introduction to the broad concept of food, its procurement, distribution and relationship to human health. Not open to freshmen. Cr 3.

IDL 65. Meat Technology—The basic science of meat and meat processing, packing house methods and cutting of meat. Rec 2, Lab 2, Cr 3.

98. Independent Studies—Independent studies in restricted areas of food science: (1) special topics, (2) food consumption and chemical changes, (3) food spoilage and fermentation, (4) food processing, (5) food biochemistry (6) food biochemistry. Prerequisite: permission of department. Cr Ar.

101. Food Processing Industry Principles and Problems—Scope of the food manufacturing industry, processing principles and practices discussed in relation to product quality and problems involved. Rec 3, Lab 2, Cr 3.

IDL 138. Food Microbiology—Importance of microorganisms in food processing, spoilage, and preservation. Role of microorganisms in fermentation and production of protein, enzymes, and other products. Food as vehicle of infection and intoxication. Cr 3.

202. Food Industry Quality Control—Formulation of product criteria, quality evaluation (sensory and objective procedure) and quality control procedures. Prerequisite: permission of instructor. Rec 2, Lab 2, Cr 3.

282. Problems in Food Science—(1) Special topics, (2) food chemistry, (3) food microbiology, (4) food preservation, (5) sensory quality evaluation, (6) food biochemistry, (7) food analysis. Prerequisite: permission of department. Cr Ar.

INTERNATIONAL AGRICULTURAL DEVELOPMENT

Director Lewis E. Clark

The program was created to focus on food production and human nutrition appropriate to the less developed countries (LDC). A major goal is to serve as a center and catalyst for the initiation and coordination of international agricultural development activities. Faculty throughout the campus will contribute to this interdisciplinary effort with ideas and active participation in the program.

As a part of this program, a 'minor' area of study is offered.

Curriculum for Minor in International Agricultural Development

			Hours
Required Courses:			12
IDL (P.AnV) 43	Tropical Agriculture	3	
Ec 138	Economic Development	3	
Foreign Language (two semesters, one language)		6	
Elective Courses (recommended)			11
(Minimum of 11 credit hours selected from the following:)			
ARE 24	Sociology of Rural Life	3	
ARE 124	Contemporary Rural Problems	3	
ARE 150	Human Factors in Resource Development	3	
ARE 186	Government Policies Affecting Rural America	3	
Ay 141, 153, 155	People and Cultures	3	
Ay 158	Culture and Economic Development	3	
Ay 165	Political Anthropology	3	
Ay 167	Peasant Societies	3	
Ec 139	International Trade and Commercial Policy	3	
FN 41	Intro. to Food and Nutrition	3	
Geo 10	Geography of Maine	3	
Hy 7, 8	Asian Civilization	3/3	
Hy 149	Argentina, Brazil, and Chile	3	
Hy 150	Mexico	3	
Hy 152	Problems of Latin America	3	
Pol 123	Political Geography	3	

Pol 165	Government in South Asia	3
Pol 166	Government in East Asia	3
Pol 167	African Politics	3
Pol 168	Government in Latin America	3
Pol 173	International Relations	3
Pol 174	U.S. Foreign Policy	3
Pol 177	Politics of the Middle East	3
Pol 196	International Affairs Internship	3
Intermediate Foreign Language (maximum 6 hours)		
		23

MILITARY SCIENCE

Professor of Military Science LTC Russell; Assistant Professors MAJ Reed, CPT Groom, CPT Edwards, CPT Miller; Instructors SGM Allen, MSG Trussell; Supply Technician Bowden; Administrative Supervisor Mrs. LaFontaine; Secretary Mrs. Humphrey

General—The Department of Military Science conducts a General Military Science curriculum prescribed by the Department of the Army for the Senior Division, Army Reserve Officers Training Corps (ROTC). This program provides for awarding of commissions in the various branches of the Army after considering the individual's preferences and qualifications, and the manpower needs of the Army.

Purpose—The purpose of Army ROTC is to prepare college students who have the qualities and the attributes essential to their progressive development, to be Army officers, with particular emphasis on the United States Army Reserve and Army National Guard. Those students who have been designated Distinguished Military Students, based on their academic and military science performance, may if they desire apply for an appointment in the Regular Army.

Curriculum—The complete ROTC program consists of a Basic Course and an Advanced Course. Normally the Basic Course is taken during the student's freshman and sophomore years. However, other students may enroll in the Basic Course by receiving permission from the Professor of Military Science. Students who have received previous military training (veterans, military academies, Junior ROTC, etc.) may be granted credit for the Basic Course or portions as determined by the Professor of Military Science. Students who complete or receive credit for the Basic Course may apply to the Professor of Military Science for admission to the Advanced Course. If admitted, the student is enlisted in the U.S. Army Reserves and receives $100 per month during the junior and senior years. Students who complete the Advanced Course are appointed second lieutenants in the U.S. Army.

THE BASIC COURSE

To complete the Basic Course the student must complete the core curriculum and two of the electives listed below, or the student must complete ROTC Basic Camp (MT 29). The core curriculum consists of MT 11 and MT 22. The student may enter the Basic Course by taking any of the courses listed below, provided the course is listed in the Schedule of Classes for the semester concerned.

MT 11. Introduction to ROTC and the U.S. Army—The purpose and organization of the ROTC program. The role of officers. Customs, courtesies, and traditions. An overview of the defense establishment. The importance of the Reserve Components (U.S. Army and Navy National Guard). Future direction of the U.S. Army. Participation in Leadership Laboratory one evening each week and on occasional weekends is required. Cr 1.

MT 12. National Security—Technological advances and their influence on warfare. Organization of the U.S. Army and the national defense structure. Factors and instruments of national power and the attainment of national objectives. Participation in Leadership Laboratory one evening each week and on occasional weekends is required. Cr 1.

MT 13. Rifle Marksmanship—History of the rifle. Rifle parts and functional operation. Ammunition, and how a rifle fires. Rifle maintenance. Rifle handling safety procedures. Sighting and aiming, and firing positions. Range firing. Participation in Leadership Laboratory one evening each week and on occasional weekends is required if student is enrolled in ROTC. Cr 0. Pass/Fail.

MT 14. Pistol Marksmanship—Pistol parts and operation. Pistol ammunition, safety, and range procedures. Positions and grip. Sighting and aiming, and making shots count. Pistol maintenance. Range firing. Participation in Leadership Laboratory one evening each week and on occasional weekends is required if student is enrolled in ROTC. Cr 0. Pass/Fail.

MT 15. Patrolling—Planning a patrol, to include organization, equipment, communication, movement, inspection, and rehearsal. Estimate of distances. Sounds and smells. Participation in a patrol. Participation in leadership laboratory one evening each week and on occasional weekends is required if student is enrolled in ROTC. Cr 0. Pass/Fail.

MT 16. Orienteering—Use information placed on a map. Indicate coordinates on a map. Measure map and ground distance. Plot and measure azimuths. Navigation techniques. Cross country travel. Design, organize, run, score, and evaluate free, score, line, and project orienteering. Participation in leadership laboratory one evening each week and on occasional weekends is required if student is enrolled in ROTC. Cr 0. Pass/Fail.

MT 17. Military Physical Fitness—Leading and participating in military conditioning exercises and programs. The Army Physical Fitness Tests. Run For Your Life. Participation in Leadership Laboratory one evening each week and on occasional weekends is optional. Cr 0; Pass/Fail.

MT 21. Map Reading and Squad Tactics—Reading and interpreting maps and aerial photographs. Marginal information, map grid coordinates, scale and distance, directions. Use of the compass, intersection/resection, elevation and relief. GM angle, and map substitutes. Rifle squad organization. Squad movement techniques and actions on contact. Hand and arm signals, field fortifications, camouflage and concealment, and techniques of fire. Estimate of the situation, rifle squad in the attack, and rifle squad in the defense. Infantry-tank teams. Patrolling. Participation in leadership laboratory one evening each week and on occasional weekends is required. Cr 2.

MT 22. American Military History—Development of the U.S. military system from colonial times to present. Examination of the principles of war and how they impact on military organizations and tactics. Participation in Leadership Laboratory one evening each week and on occasional weekends is required. Cr 2.

MT 23. Napoleonic Warfare—Development of a detailed appreciation for the principles of war. In-depth analysis of Napoleonic campaigns and tactics. MT 22, American Military History recommended, but not required as a prerequisite. Participation in Leadership Laboratory one evening each week and on occasional weekends is required. Cr 2.

MT 24. Survival Module—Instruction and practical experience in cold weather survival and techniques. Enhancement of the student's self-confidence in his/her ability to survive in a rigorous environment. Includes a two-day, overnight, outdoor exercise. Participation in Leadership Laboratory one evening each week and on occasional weekends is required if student is enrolled in ROTC. Cr 0; Pass/Fail.

MT 25. Air Assault School—A ten-day school conducted at Ft. Campbell, Kentucky on the tactical utilization of Army Helicopters. Available only to students in the ROTC Program. Students who graduate are awarded the Army Air Assault Badge. Cr 0; Pass/Fail.

MT 26. Airborne School—A three-week school conducted at Fort Benning, Georgia. Available only to students in the ROTC Program. Students who graduate are awarded the Army Parachutist Badge. Cr 0; Pass/Fail.

MT 27. Winter Survival School—A five-day school conducted at Brunswick Naval Air Station and in the Rangeley area by the U.S. Navy. Transportation is provided by the Army. Instruction and practical experience in winter survival equipment and techniques. Enhancement of the student's self-confidence in his/her ability to survive in an extremely rigorous environment. Offered during January. Students apply for enrollment to the Professor of Military Science during December. Cr 0; Pass/Fail.

MT 29. ROTC Basic Camp—A six-week summer camp conducted at Fort Knox, Kentucky. The student receives pay, and travel costs are defrayed by the Army. The environment is rigourous, and is similar to Army Basic Training. No military obligation incurred. Training includes the role and mission of the U.S. Army, map reading and land navigation, first aid, marksmanship, leadership, physical training and parades, and tactics. Completion of MT 29 satisfies all Basic Course requirements. Three different cycles offered during the summer, but candidates are accepted only during the first two months of the spring semester. Participation

in a physical fitness program during the spring semester is required. Students apply for enrollment to the Professor of Military Science. Selection for attendance is based on qualifications and merit. Cr 6.

THE ADVANCED COURSE

The courses listed below are required for completion of the Advanced Course. In addition, students are required to attend a six-week ROTC Advanced Camp at Fort Bragg, North Carolina between their junior and senior year. In exceptional cases, ROTC Advanced Camp may be deferred by the Professor of Military Science until the student completes the senior year. Selected students may attend Ranger School in lieu of ROTC Advanced Camp.

MT 31. Leadership—Exposure to the branches of the Army. How to plan and conduct military leadership. Exposure to the various leadership theories and to the leadership environment. Fundamentals of leadership, human behavior, communication, and contemporary human problems. Participation in Leadership Laboratory one evening each week and on occasional weekends is required. Cr 3.

MT 32. Advanced Tactics—Exposure to military equipment and military tactics at the squad, platoon, and company level. Completion of Advanced Camp prerequisites in Leadership Laboratory one evening each week and on occasional weekends is required. Cr 2.

MT 41. Military Management—Exposure to military law. Analysis of legal problems facing small unit leaders. The Code of Conduct. Management theory. Motivation theory. Training, personnel, and logistics management practices. Management by Objective (MBO) and Organizational Effectiveness (OE). The Modern Volunteer Army (MVA) and total Army goals. Participation in Leadership Laboratory one evening each week and on occasional weekends is required. Cr 2.

MT 42. Operations and Seminar—Exposure to larger unit operations at the brigade and battalion level. Sequence of command and staff actions—the problem solving process. Organization of the division, brigade, and battalion. Preparation of combat orders. Discussion of current military problems in the leadership/management area. Case studies. Participation in Leadership Laboratory one evening each week and on occasional weekends is required. Cr 3.

MTL. Leadership Laboratory—Leadership Lab is a requirement for all regular program cadets. The purpose of Leadership Lab is to provide the environment wherein each cadet can develop and improve military leadership skills. Continuous counselling and periodic evaluations of cadet performance are the primary methods used. (In case of class conflicts an alternate Leadership Lab will be arranged to meet student requirements).

SCHOLARSHIP PROGRAM

The Department of Army offers a three-, two-, and one-year ROTC Scholarship to select freshman, sophomore, and junior cadets, respectively, who are enrolled in the Military Science Program, and who have demonstrated outstanding leadership and scholastic qualities. This scholarship pays full tuition for the respective number of years, all textbooks and laboratory fees, plus $100 per month during the academic year for the duration of the scholarship.

SIMULTANEOUS MEMBERSHIP PROGRAM

Students who are members of the Army National Guard of the Army Reserve and who have completed basic training may qualify for entry into the Advanced Course. The student is automatically advanced to the pay grade of E-5 in his Guard/Reserve unit upon entering the ROTC Program and receives training as a "Third Lieutenant". Upon completion of the Advanced Course, the student is eligible to be commissioned as a Second Lieutenant in the National Guard, Army Reserve or Active Army.

ADDITIONAL ACTIVITIES

Rifle Marksmanship Training—Offered to all enrolled ROTC students. The UMO Rifle Team has an enviable record and has won many trophies. Those qualifying may compete in the scheduled varsity and ROTC matches. Rifle markmanship is a major sport of the University and is coached by the Military Department. Participation in varsity riflery enables individuals to earn a varsity letter.

Ranger Club—An organization devoted to rugged outdoor activities. Members participate in rappelling, mountain climbing, survival training, hiking, land navigation, and snowshoeing. (Open to all students.)

Orienteering Club—A land navigation sport. Members participate in competitive matches that require the traverse of a prescribed course against time. Courses are designed by the members and are run over different types of terrain on foot, snowshoes, or skis. (Open to all students.)

SPECIAL LSA COURSES, PROGRAMS AND MINORS

GENERAL COURSES

LSA 1 Orientation—Several weekly group meetings on academic policies and career development along with periodic adviser-advisee meetings. Lec 1, Cr 0.

LSA 17.18. Freshman Seminar—Small group discussions of topics dealing with various issues of modern society. Open to all freshmen in the College of Life Sciences and Agriculture other than those enrolled in the University's Honors Program. Rec 1, Cr 1.

Mhe 50. Man and His Environment—Effect of the biological and physical environment on life and man. A basic, interdisciplinary, introduction to environmental issues. Students investigate one environmental topic of their choice in detail. Div. 1 open to all students. Div. 2 open to all students in the College of Life Sciences and Agriculture and the College of Education, and only to those students in the College of Arts and Sciences who are student teaching. Offered as an eight-week block course. Rec 3, Cr 3.

LSA 114. Cooperative Education—Practical experience for the undergraduate student, combining work in a business firm, industry or public agency with academic courses and supervision. Opportunity for student to gain experience, to integrate classroom learning with job performance, and to develop future placement possibilities. Prerequisite: junior standing and permission; use of letter grade. Open to Wood Science and Technology students only. Cr 1-16.

115. Cooperative Education—Practical experience for the undergraduate student, combining work in a business firm or public agency with academic courses and supervision. Opportunity for student to gain experience, to integrate classroom learning with job performance, and to develop future placement possibilities. Prerequisite: junior standing and permission. Cr 1-6. (Pass/Fail)

LSA 141. Energy and Man—The energy crisis. Extent of our demand for energy and the forms in which we need it. Methods of matching sources to demand with a view to insuring continous availability and conserving our environment. Lec 2, Rec 1, Cr 3. (CED only)

LSA 142. Metals and Man—The influence of metals technology on man's existence. A practical look at testing, properties, manipulation, fabrication, and utilization of metals is included. Production and processing methods will be examined with consideration of environmental effects. Welding instruction. A lab fee of $8 must accompany registration. No prerequisite. Cr 3, CED only.

LSA 143. Shelter and Man—Review of man's efforts to provide shelter for himself. Topics covered include analyzing a family's housing needs, selecting a site, room layout, design of framing members, fasteners, selection of materials and financing. Both lectures and practical work will be included. A course fee of $20 will be assessed to cover material costs. Cr 3, CED only.

PROGRAMS

COOPERATIVE PROGRAM WITH BANGOR THEOLOGICAL SEMINARY

Regularly enrolled students in the College of Life Sciences and Agriculture may register for courses at the Bangor Theological Seminary, not to exceed six credit hours per semester, without paying additional fees. The college extends a like privilege to students regularly enrolled at the Seminary. All registrations must have the approval of the academic deans of both institutions and the instructors involved. Credit for courses so taken will be considered a part of the student's program at the institution where enrolled.

While enrolled at the seminary a student may with approval of his dean and the Admissions Office of the University, also register as a special student in the College of Life Sciences and Agriculture on the established fee basis for such courses. Work so taken, if it does not represent duplicate courses taken in the Seminary program, may be counted as advanced standing credit toward the degree in the event a student later registers for a degree program at the University.

Pre-Professional

PRE-VETERINARY CURRICULUM

The University offers a pre-veterinary curriculum that prepares the student to apply for admission to a veterinary college. The University does not offer a veterinary medical degree program. Students who do exceptionally well in the pre-veterinary program may be considered for admission to a veterinary college at the end of three years, however, the majority of students interested in veterinary medicine attend the University of Maine at Orono for four years as candidates for the B.S. degree in animal science.

Pre-vet students majoring in animal sciences include courses required by the veterinary colleges to which they seek admission by planning courses in consultation with their advisor and courses required to meet the minimum degree requirements in the animal sciences curriculum. This approach will provide the student the opportunity to plan for professional alternatives such as graduate studies in an animal oriented speciality.

Students transferring to a veterinary college at the end of three years may apply to the University of Maine at the time they receive their DVM degree for transfer credit from this professional degree so they may also qualify for their B.S. degree from Maine.

As a guide for the prospective student who is interested in veterinary medicine, the following curriculum is suggested. Adjustments may be made in the selection of courses to fit the specific requirements for particular veterinary colleges. Courses not listed in the sample curriculum, but which should be considered where possible, include a foreign language, Ms 19 Principles of Statistical Inference, and additional humanities and/or social sciences.

Freshman Year

Fall			**Spring**		
ANV 45	Animal Science	3	ANV 63	Career Seminar	1
Ch 11	General Chemistry	4	Ch 12	General Chemistry	4
LSA 1	University Life	0	Eh 1	College Composition	3
Bio 1	Basic Biology	4	Zo 4	Animal Biology	4
Ms 22	Algebra & Trigonometry	4	Ms 26	Analyt Geo & Calc	4
	Electives*	0-3			
		15-18			16

Sophomore Year

ANV 60	Animal Gen	3	Zo 177	Animal Physiology	4
Ch 151	Organic Chemistry	3	Ch 152	Organic Chemistry	3
Ch 161	Organic Chem Lab	2	Ch 162	Organic Chem Lab	2
Sc 3	Fund of Public Sp	3	Mb 127		
Zo 133	Comparative Anatomy	4	Or 128	Gen Microbiology	5
	Electives*	3		Electives*	1-3
		18			15-17

Junior Year

ANV 155	Animal Nutrition	3	ANV 156	Applied: An Feed	4
ANV 172	Animal Endocrinology	3	ANV 161	Animal Breeding	3
ANV 137	Animal Diseases	3	ANV 47	Equine Science	3
Ch 140	Quantitative Analysis	4	ANV 85	Poultry Technology	3
Fs 101	Food Processing Industry	3	Zo 136	Developmental Biology	4
		16			17

Senior Year

ANV 74	Senior Topics	1	ANV 180	Physiology of Reprod	4
ANV 48	Livestock Mgt	3	ANV 46	Dairy Cattle Technology	3
Ps 1a	General Physics	4	Ps 2a	General Physics	4
Bc 161	Advanced Biochem	4		Electives*	3-6
	Electives*	3-6			
		15-16			14-17

DAIRY MANUFACTURE

A cooperative agreement with the University of Vermont offers an opportunity for students to secure training in dairy manufacturing. The first two years of a four-year course are offered at the University of Maine. The final two years are completed at the University of Vermont. Residents of Maine are admitted to the University of Vermont for the last two years of the course at the Vermont resident tuition rate. The first two years of this program at Maine are supervised by the Department of Animal and Veterinary Sciences.

FOOD PROCESSING

As part of the New England Board of Higher Education plan for regional cooperation, the first two years of a program in Food Science and Technology may be taken at the University of Maine (Department of Food Science) and the final two years of specialized training at the University of Massachusetts. Residents of Maine are admitted to the University of Massachusetts for the last two years at the Massachusetts resident tuition rate.

Alternately, students wishing to complete their training at the University of Maine may do so by enrolling in their last two years in the Food Science Option in Biology.

Curriculum

Freshman Year

Fall Semester		Credit Hours	Spring Semester		Credit Hours
LSA 1	Orientation	0	ARE 48	Economics	3
Ch 11	Chemistry	4	Ch 12	Chemistry	4
Bio 1	Basic Biology	4	Ms 27	Calculus	4
Eh 1	College Composition	3	Zo 4	Animal Biology	4
Ms 26	Analytic Geom. & Calc.	4			
		15			15

Sophomore Year

AnV 135	Anatomy	3	Bt 2	Plant Kingdom	4
Ch 151	Organic Chemistry	3	Ch 152	Organic Chemistry	3
Ch 161	Organic Chemistry Lab	2	Ch 162	Organic Chemistry Lab	2
Mb 127			Mb 136	Determinative Micro.	4
or 128	Microbiology	5	Ps 2a	Physics	4
Ps 1a	Physics	4			
		17			17

HONORS PROGRAM (Hr)

The Honors Committee of the College of Life Sciences and Agriculture consists of: A. DeSiervo, J. Dimond, M. Gershman, S. Goltz, F. Knight, L. Laber, W. McIntire, R. Owen, R. Rowe, R. Roxby, and B. Slabyj; W. Pullen is chairman and H. Metzger is secretary of the Committee

Freshmen of marked academic ability enrolled in all colleges are invited to apply to the secretary for admission to the sequence of honors courses listed here. The work of the freshman and sophomore years, under the direction of staff drawn from all colleges of the University, provides the stimulus and the guidance which should enable a superior student to begin building for himself a perspective view of the liberal arts and sciences and to lay a foundation for the more specialized work which is to come. The Honors Program reaches its climax in a research project for a thesis which is written during the senior year and treats some special area within the student's major field. Students may be admitted at any stage of the Honors Program up to the opening of the junior year. Of the courses listed below, Hr 41, 45, 47, and 48 are taken in common with students from other colleges within the University. These courses, plus Hr 151.152 and 153.154 constitute the core of the Program.

Additional information about the Honors Program and a full description of courses will be found elsewhere in the catalog. See Index.

Hr 41 or Hr 45 meets the Eh 1 requirements of the College of Life Sciences and Agriculture. Hr 41, 45 and Hr 47,48 may be used to meet up to nine hours of the elective Humanities and

Social Science requirements of the college. Hr 153.154 meet the Eh 17 requirement in the School of Forest Resources. Any honors course meets the free elective requirements in a program of study upon the approval of the department chairman or school director.

41. Honors Freshman Seminar
45. Honors Colloquium
46. Honors Summer Readings
47.48. Honors Group Tutorial
49. Honors Summer Readings
60. Honors Independent Study
61. Honors Research Assistantship
62. Honors Independent Research
63. Honors Specialized Seminars
150. Honors seminar
151.152. Honors: Specialized Studies
153.154. Honors Thesis
170. Honors Distinguished Lecture Course

To graduate with honors, the student must as a minimum complete Hr 47 or Hr 48, Hr 153 and Hr 154, plus three additional credits (for a total of 12 hours) and pass an oral examination devoted primarily to the thesis research.

MINOR AREAS OF CONCENTRATION

In addition to a program major, a student may elect a minor area of concentration. Those that have been approved follow. Requirements in each area include the completion of specified courses and a minimum of 15 credit hours of courses above the introductory level. Students who decide to pursue a minor area of specialization make a declaration by the beginning of the junior year. A "minor selection card," available at the Dean's office, must be completed and processed in order to establish official recognition of a minor program.

AGRICULTURAL SCIENCES

This minor requires 15 credit hours of introductory level courses and 12 credit hours of upper level courses in the agricultural sciences. While it is designed primarily for students majoring in one of the biological science fields, it may be used by students majoring in other fields.

Requirements				**Credits**
A.		INTRODUCTORY COURSES		
	AnV 45	Animal Science		3
	S 2	Soil Science		3
	P 21	Crop Science		3
	ARE 48	Principles of Agricultural Economics (acceptable as Social Science)		3
	IDL 24	Sociology of Rural Life (acceptable as Social Science)		3
			15	
B.		UPPER LEVEL COURSES		12
(AnV, AE, ARE, Bt, PSc, and Food Science outside the major)				
Total				27

BIOLOGY EDUCATION

A minor is offered in biology education which leads to certification to teach biology in secondary schools. Students in the biological sciences, including animal and plant sciences, normally meet the biology subject matter qualifications in their major program of study. In addition, the following professional education courses are required:

		Credit Hours
EdB 2	American School*	3
EdB 3	Growth Learning Process*	3

EdB 4	Teaching Process	3
EdM 142	Teaching of Sciences in Secondary School	3
EdM	Student Teaching	6
		18

Students interested in undertaking a minor in biology education should confer with their academic advisor and sign up in the office of the Dean, College of Education.

*May be counted as social science courses.

BOTANY

A minor in botany consists of four required courses and a list of optional courses from which one or more may be selected to meet the requirements of 15 hours above the introductory level.

Required Courses		**Credit Hours**
Bt 2	The Plant Kingdom	4
Bt 135	Plant Anatomy	4
Bt 153	Plant Physiology	3
Bt 164	Taxonomy of Vascular Plants	4
Select One Course:		
Bt 33	Dendrology	4
Bt 150	Botanical Microtechnique	4
Bt 154	Intermediate Plant Physiology	4
Bt 156	Plant Pathology	4
Bt 158	Bryology	3
Bt 159	General Mycology	4
Bt 173	Biology of Marine Algae	4
Bt 183	Biology of Fresh Water Algae	4

CANADIAN STUDIES

The program is interdisciplinary and designed to appeal to students in many fields who have an interest in Canada. The major prerequisite is CAN 1, Introduction to Canadian Studies. The course acquaints freshmen and sophomores with varied aspects of the Canadian experience: society, culture, history, native peoples, environment, education, technology, economy, and diplomacy.

Required Courses:		**Credit Hours**
CAN 1	Introduction to Canadian Studies	3
	Other Canadian courses	15
	Total	18

Canadian Core Courses

Ay 122	Folklore of Maine and the Maritime Provinces
Ay 160	People and Cultures of the Circumpolar Area
Eh 190	Canadian Literature
Eh 292	Literature of Maine and the Atlantic Provinces
FI 97	French May Term in Quebec City
Fr 9.10	Masterpieces of French Canadian Literature
Fr 54	Quebec in Transition, 1960-Present
Fr 56	French Canadian Civilization
Fr 156	Seminar in Quebec Studies
Fr 252	Films, Video Drama and Literature in French Canada
Fr 296	Seminar in French Canadian Literature and Language
Geo 150	Geography of Canada
Hy 159	History of Canada to 1850
Hy 160	History of Canada since 1850
Hy 221	Canada and the United states
Hy 222	Canadian Economic History
IDL 237	Canadian Government and Politics
Sy 131	Canadian Society

Student advisers should consult with Director, Canadian-American Center, Canada House, 160 College Avenue, for more information and program planning.

CHEMISTRY

The minor in chemistry is available to any interested student in the College of Life Sciences and Agriculture. The minor program requires an introductory chemistry course selected from those which are prerequisite to advanced courses in the department, plus 15 hours beyond the introductory level.

No specific course requirements are made in order to retain maximum flexibility in meeting a student's needs. However, each student's program should be formulated in consultation with the student's minor adviser, and the program, approved by the adviser, must be filed with the office of the dean of the college at the time the student formally applies for recognition of his minor program.

COMPUTER SCIENCE

The courses listed below provide the basic requirements for a minor in Computer Science.

	Credit Hours
CS 181 Intro. to Computer Science I	3
CS 182 Intro. to Computer Science II	3
CS 189 Computer Architect and Assembler Lang.	3
CS 190 Operating Systems	3
CS 198 Computer Graphics	3
	15

ENTOMOLOGY

A minor in Entomology consists of two required courses and a list of optional courses from which sufficient courses will be selected to meet the requirements of a minimum of 15 credit hours above the introductory level.

Required Courses:	**Credit Hours**
En 140 Insect Biology and Taxonomy	4
En 143 Forest Insect Ecology	
Or (Depending on area of interest of student)	3
En 149 Economic Entomology	3
Optional Courses:	
En 47.48 Problems in Entomology	1-2-3
En 143 or En 149	3
En 153 Biology & Taxonomy of Advanced Orders	3
En 211 Insect Ecology	4
En 214 Medical Entomology	3
En 230 Aquatic Entomology	4
En 251 Morphology of Insects	4
En 261.262 Seminar	1

FOOD AND NUTRITION

The minor in Food and Nutrition is available to students in all colleges but might be of particular interest to students majoring in biology, social sciences, physical education, child development, or special education. Courses are to be selected from the recommended list according to the student's science background after consultation with a member of the nutrition faculty. The minor does not lead to credentialing in the field of dietetics without further study.

Selected course list (minimum of 15 hours)

	Credit Hours
FN 42 Family Food Management	3
FN 43 Experimental Foods	4
FN 61 Quantity Food Production	3
FN 148 Man and His Food	3
FN 149 Problems in Food and Nutrition Education	3
FN 152 Human Nutrition	3
FN 156 The Nutrition of Children	3

GEOLOGY

A geology minor consists of 15-16 credits beyond the introductory level (Gy 1, 5 or 6). Specifically designed curricula can be arranged in consultation with the department involved. The normal course sequence is as follows:

	Credit Hours
Gy 1, Gy 5, or Gy 6	3(4)
Gy 2 Geology	4
Gy 111 Mineralogy	4
Gy 112 Intro to Petrology	4
Gy (Pertinent Gy electives)	3(4)
	18-20

JOURNALISM

The minor in journalism is available to any student in the College of Life Sciences and Agriculture. The student has his primary emphasis in one of the major fields of study in the college and adds journalism as a secondary field of study. The general electives in the various programs allow flexibility and permit selection of courses for a journalism minor.

This minor is designed to prepare a student for a career in agricultural and biological science in advertising, news editorial or broadcast news.

Required Courses:		Credit Hours
Jr 22	Survey of Mass Communications	3
Jr 175	Law of Publications*	3
Jr 31/32	Newswriting and Reporting I	3
Select one of the journalism sequences:		**15**
(1) Advertising		
(2) News Editorial		
(3) Broadcast News		
	Total Required	24

*Acceptable as social science course

Note: RTV 171, Writing for Broadcast (3 cr. hr.) may be substituted for one semester of Jr 31-32; RTV 173, Television Production Laboratory, may be substituted for one semester of Jr 95-96.

MATHEMATICS

The minor in mathematics provides the student an opportunity to engage in a secondary area of concentration and receive proper recognition.

Required Courses:		Credit Hours	
Ms 27	Analytical Geometry and Calculus	4	
Ms 28	Analytic Geometry and Calculus	4	
Ms 59	Differential Equations	4	
Ms 151	Vector Analysis	3	
or			
Ms 162	Linear Algebra	(4)	15(16)
Select one course from below:			
Ms 135	Mathematics Statistics	3	
Ms 134	Intro. to Statistics	4	
Ms 187	Numerical Analysis	3	3(4)
			18(20)

PLANT AND SOIL SCIENCES

The minor in either Plants or Soils is designed primarily for students majoring in the College of Life Sciences and Agriculture (except Plant and Soil Sciences), but may be used by students majoring in other colleges. A minor in either area provides an opportunity for the student to obtain a background in a secondary field of study.

A. Plant Minor

1. Core Requirements

	Credits
Bt 153 — Plant Physiology	3

P 21 — Crop Science	3
P 22 — Crop Management	4
P/S 173 & 174 — Seminar	2
	12

2. Electives

Bt 164 — Taxonomy of Vascular Plants	4
P 1 — Horticulture	3
P 30 — Ornamental Horticulture	3
P 31 — Landscape Plant Materials	3
P 33 — Greenhouse Management	4
P 34 — Agrostology	3
P 35 — Art of Home Landscaping	3
P 143 — Prin. of Weed Control	3
P 163 — Bioclimatology	3
P 166 — Plant Propagation	3
P 122A.122 — Adv. Crop Management	3
S 151 — Soil Fertility	3

*The student will select at least 3 courses from this list, one of which must be either Bt 164, P 143, P 163, P 166, P 122A, 122B or S 151.

B. Soil Minor

1. Core Requirements

	Credits
S 50 — Soil & Water Conservation	2
S 52 — Land Use Planning (Soil Aspects)	2
S 151 — Soil Fertility	3
S 152 — Soil Taxonomy	3
P/S 173 & 174 — Seminar	2
	12

2. **Electives

Gy 241 — Glacial Geology	3
P 21 — Crop Science	3
P 163 — Bioclimatology	3
IDL 140 — Seminar in Quaternary Studies	2
S 154 — Chemical Properties of Soils	4
S 156 — Physical Properties of Soils	3

**The student will select at least 3 courses from this list.

SOCIOLOGY OF RURAL LIFE

The minor in the Sociology of Rural Life is designed to provide a substantive foundation in rural sociology. At the same time the curriculum provides an opportunity for the student to obtain a sampling of social science courses which could serve as a valuable foundation in many fields of endeavor.

Curriculum

		Credit Hours
IDL 24	Sociology of Rural Life	3
IDL 124	Contemporary Rural Problems	3
IDL 129	The Individual and the Community	3
ARE 150	Human Factors in Resource Development	3
Py 1	General Psychology	3
Py 130	Social Psychology	3
Sy 3,4	Introductory Sociology	
Ay 1,2	or Anthropology	6

SPANISH

A minor in Spanish consists of a minimum of 18 cr. hrs. in Spanish above the elementary level courses.

ZOOLOGY

A minor in Zoology consists of a minimum of 15 credit hours of 100-level or above courses. (Biology majors are *not* allowed to take a Zoology minor).

TECHNICAL DIVISION

Director Robert B. Rhoads

Seven associate degree programs are offered at the University of Maine at Orono by the College of Life Sciences and Agriculture (LSA) through its Technical Division.

The programs are administered through their respective Life Sciences and Agriculture departments at Orono. Course offerings in the technical programs are distinct and separate from those offered for baccalaureate degree students. Technical courses are of a practical nature and place emphasis upon the development of skills for immediate application. Instruction is provided by regular University faculty who are specialists in their field. Laboratory instruction and field experience represent an essential part of the technical training program.

The basic objectives of educational programs in the Technical Division are: (1)to provide a practical working knowledge of fundamental principles in specific technical fields which will develop competence for gainful employment; (2)to develop competence in written and oral communications; (3) to contribute to the development of the student's intellectual capacity and personal growth; and (4) to prepare graduates for roles as citizens and effective community leaders. While the programs are not specifically designed as preparatory for four-year professional curricula, there is a recognized continuum permitting able students whose educational objectives change to transfer to four-year programs, upon the successful completion of associate degree programs. Students graduating from associate degree programs in Life Sciences and Agriculture with an accumulative average of 2.5 or above may be considered for transfer to four-year B.S. programs at UMO. Two to three additional years are generally required to complete the baccalaureate degree depending upon the program selected.

An associate of science degree is awarded to graduates of the programs. Requirements for this degree include the satisfactory completion of a prescribed technical curriculum with a minimum of 64 credit hours earned at an accumulative grade point average of 2.0.

A basic core curriculum of general education subjects is required in most programs, along with the technical subjects.

BASIC CORE CURRICULUM

All students enrolled in the Technical Division are expected to complete the following group of courses representing a basic core requirement:

Subject		Hours
1 LSA	Seminar in (Program Major)[1]	1
13 LSA	Applied Mathematics[2]	3
3 ENG	Critical Written Expression	3
4 ENG	Speech	3
	Humanities or Social Science Elective	3

[1]3 FY is substituted for Forest Management students.
[2]1 MST is substituted for students in Forest Management. Other students with permission may take 1 MST or other appropriate courses.

I. Agricultural Mechanization Technology Curriculum (Two-Plus-Two)

Agricultural Mechanization covers the application of engineering developments to agriculture and forestry. Opportunities in the field are many and varied, including positions on farm production units, sales and service positions with farm and forestry machinery and equipment companies, work as field technicians or supervisors with equipment test teams and as high school agriculture teachers.

The curriculum in Agricultural Mechanization includes basic physical science and agricultural science courses and covers specific aspects of machinery selection and operations.

There are two routes to a B.S. degree in Agricultural Mechanization. For those students who prefer and qualify for direct admission to the four-year program, 120 credit hours are required. For those who prefer to divide their studies into two phases, a "two-plus-two" program with an associate degree after two years is described herein. 130 credit hours are required.

Associate of Science Degree

The first two years of study in Agricultural Mechanization Technology cover the basic and practical aspects of the subject and prepare the graduate to work at the technician level. Two areas of specialization are offered during the first two years as detailed in the enclosed Program of Study, Farm Mechanization and Forestry Mechanization. The associate of science degree is awarded after two years of study. A minimum accumulative average of 2.5 for the first two years is required to continue for the bachelor of science degree in Agricultural Mechanization.

Bachelor of Science Degree

The third and fourth years of the program provide an opportunity for more depth in the scientific aspects of agricultural production and mechanization as well as opportunity for greater breadth in non-technical areas. The bachelor of science degree is earned after these studies. The full range of positions in Agricultural Mechanization is available to holders of the B.S. degree.

FIRST AND SECOND YEAR SUBJECTS (leading to an Associate of Science degree)

Required Courses		**Credit Hours**	**Minimum Degree Hours Required**
A. SCIENCE AND MATHEMATICS			9
13 LSA	Applied Math	3	
2 Mst	Trigonometry and Algebra	3	
1 Bt	Introductory Botany	3	
B. MAJOR FIELD			22
5 AE	Power Technology	3	
10 AE	Electrification	3	
11 AE	Soil & Water Management	3	
AE 84	Basic Shop	3	
9 AE	Farm Buildings	3	
4 CeT	Elementary Surveying**	3	
21 GeT	Technical Drawing	3	
1 LSA	Seminar in Ag. Mech.	1	
C. SUPPORTING COURSES			9
2 ARE	Economics	3	
8 ARE	Accounting	3	
20 ARE	Business Management	3	
D. COMMUNICATIONS AND HUMANITIES			9
3 Eng	Critical Written Expression	3	
4 Eng	Speech	3	
	Humanities and Social Science Elective	3	
E. AREA OF SPECIALIZATION			18
TOTAL CREDITS REQUIRED FOR ASSOCIATE OF SCIENCE DEGREE			**67**

AREAS OF SPECIALIZATION

Forestry Mechanization			**Farm Mechanization**		
16 AE	Forestry Machinery Systems	3	8 AE	Farm Machinery & Tractors	3
2 Fy	Applied Silviculture	4		Animal of Plant Sci. Elec.	3
5 FY	Forest Measurements	4	9 MeT	Machine Shop & Welding	3
1 S	Fund. of Forest Soils	3	2 S	Soils & Fertilizers	4
	Supp. Course Electives	4		Supp. Course Electives	5
		18			18

**1,2,CeT Plane and Advanced Surveying may be substituted.

THIRD AND FOURTH YEARS (leading to a B.S. degree for qualified students)

Required Courses	**Credit Hours**	**Minimum Degree Hours Required**
A. SCIENCE AND MATHEMATICS		15

Ps 1a & 2a	General Physics	8	
Ch 11 or Bc 7	Chemistry	4	
Ms 19 or Fy 4	Statistics	3	
B. MAJOR FIELD			15
AE 20	Principles of Mechanization	3	
AE 31	Field Machinery Management	3	
AE 33	Fluid Power Technology	3	
AE 39	Agri. Processing Tech.	3	
AE	Elective	3	
C. SUPPORTING COURSES			21
	Electives	21	
D. HUMANITIES AND SOCIAL SCIENCE			12
	Electives	12	
Sub Total (3rd & 4th years)			63
TOTAL CREDITS REQUIRED FOR BACHELOR OF SCIENCE DEGREE			**130**

II. Animal Agriculture Technology Curriculum

This program of study provides technical training and experience for careers in animal production in dairy cattle, poultry, beef cattle, pleasure horses, sheep, swine, and the related sales and service industries. Previous farm experience is considered helpful for enrollees. Graduates frequently return to the home farm or are employed as herdsmen or foremen on other farms. An increasing number of graduates are employed in the integrated broiler or market egg industries or in sales and service in the feed, fertilizer, and machinery industries. Other employment opportunities include soil conservation service, breeding technicians, D.H.I.A. field men, and the Peace Corps.

			Required Hours
A. BASIC CORE CURRICULUM			13
1 LSA	Seminar in Animal Agriculture Tech.	1	
13 LSA	Applied Mathematics	3	
3 Eng.	Critical Written Expression	3	
4 Eng.	Speech	3	
	Humanities or Social Science Elective	3	
B. ANIMAL & VETERINARY SCIENCE			24(25)
1 AnV	Dairy Cattle	3	
2 AnV	Animal Production	4	
3 AnV	Animal Selection	2	
4 AnV	Animal Breeding	3	
6 AnV	Animal Feeding	3	
7 AnV	Poultry Production	3(4)	
12 AnV	Reproduction and Breeding	3	
15 AnV	Livestock Diseases	3	
C. AGRICULTURE TECHNOLOGY			10
3 ARE	Farm Management	3	
2 S	Soils and Fertilizers	4	
3 P	Forage Management	3	
D. FREE ELECTIVES			16(17)
	Total		64

III. Animal Medical Technology Curriculum

The course of study provides technical training and experience for careers as veterinary aides, laboratory animal technicians in biological and medical research laboratories, small animal hospitals and commercial testing laboratories for pharmaceutical and feed industries. The curriculum provides specialized courses in animal care, handling, anatomy, physiology and in-laboratory clinical work. A final semester of formal course work is required at the Animal Medical Center in New York City. Students will pay the usual tuition and room and board charges to the University during the three semesters on the Orono campus. However, different educational and room and board fees will be charged for the semester while at the Animal Medical Center in New York City.

			Required Hours
A. BASIC CORE CURRICULUM			10
1 LSA	Seminar in Animal Medical Tech.	1	
13 LSA	Applied Mathematics	3	
3 Eng	Critical Written Expression	3	
4 Eng	Speech	3	
B. FUNDAMENTAL SCIENCES			24
9 AnV	Mammalian Anatomy & Physiology	5	
11 AnV	Animal Nutrition	2	
12 AnV	Reproduction & Breeding	3	
16 AnV	Animal Genetics	2	
19 AnV	Laboratory Animal Diseases	3	
5 Bc	Biochemistry	4	
20 IDL	Microbiology	5	
C. APPLIED TECHNOLOGY			12
13 AnV	Large Animal Care and Handling	3	
14 AnV	Laboratory Animal Care	3	
23 AnV	Clinical Laboratory Methods	3	
24 AnV	Laboratory Methods Practicum	3	
D. COURSES AT THE ANIMAL MEDICAL CENTER			16
25 AnV	Purchasing	2	
26 AnV	Client Relations/Hospital Finance	4	
27 AnV	Medicine	4	
28 AnV	Surgery/Radiology	4	
29 AnV	Pathology	2	
E. ELECTIVES		3	
	Total		65

IV. Forest Management Technology Curriculum

Forest industries and federal and state resource agencies indicate a need for highly trained forest technicians on a continuing basis. Many positions are salaried and are supervisory in nature. Duties may include timber cruising, scaling and marking, administration of recreation areas, or assisting in forestry research. Much of the work will be in attractive outdoor surroundings. The curriculum includes six credits of practical field training. Students may not register for the fourth semester until all practical field training requirements have been satisfied.

			Required Hours
A. COMMUNICATIONS AND MATHEMATICS			15
3 Eng	Critical Written Expression	3	
4 Eng	Speech	3	
5 Eng	Technical Writing	3	
	Humanities or Social Science Elective	3	
1 Mst	Mathematics I	3	
	(Substitute for 13 LSA, Applied Mathematics)		
B. TECHNICAL FORESTRY			29
2 Fy	Applied Silviculture	4	
3 Fy	Intro. to Forest Technology	1	
4 Fy	Aerial Photo Interpretation	3	
5 Fy	Forest Measurements	4	
6 Fy	Wood Products Utilization	3	
7 Fy	Forest Protection	2	
8 Fy	Seminar	1	
9 Fy	Forest Land Management	3	
10 Fy	Field Experience	6	
12 Fy	Wood and Tree Identification	2	
C. SUPPORTING SUBJECT MATTER			23
2 Are	Economics	3	
8 Are	Accounting	3	
1 Bt	Introductory Botany	3	

5 AE	Power Technology	3	
16 AE	Forest Machinery Systems	3	
5 Get	Forestry Drawing	2	
4 Cet	Elementary Surveying	3	
1 S	Fundamentals of Forest Soils	3	
D. OTHER			5
	Elective		
	Total	5	72

V. Merchandising (Home Furnishings and Clothing) Curriculum

In recent years the rapid technological development of new textiles, new finishing processes for existing textiles, and new materials for home furnishings has created a need for personnel in the retail field at the supervisory and managerial level who have an understanding of these materials. The curriculum provides specialized courses in textiles, clothing, home furnishings, commercial and advertising design and fashion merchandising.

A seven-month placement training program at the completion of the second semester is offered to those students selected by a screening committee in cooperation with The Maine Merchants Association. This course is designed to provide on-the-job training. The cooperating merchant compensates the student at the same wage level as other beginning employees in his organization. The student who does not elect Placement Training substitutes pertinent academic courses in the third semester.

			Required Hours
A. BASIC CORE CURRICULUM			13
B. TECHNICAL HOME FURNISHING AND CLOTHING			19
1 Cd	Introduction to Design	3	
3 Cd	Textiles in Home and Clothing	3	
4 Cd	Furnishing and Decorating the Home	4	
6 Cd	Clothing the Family	3	
7 Cd	Commercial and Advertising Design	3	
8 Cd	Fashion Merchandising	3	
C. BUSINESS AND ECONOMICS			9 or 15
2 ARE	Economics	3	
4 ARE*	Marketing	3	
8 ARE	Accounting	3	
10 ARE	Sales Promotion	3	
22 ARE*	Data Processing	3	
*If 15 LSA is taken for 4 credits.			
D. SOCIOLOGY			6
6 ARE	Dynamics of Human Behavior	3	
7 ARE	Sociology and the Individual	3	
E. OTHER			11 or 17
1 LSA	Seminar in Merchandising	1	
15 LSA	Placement Training	4 or 16	
	Electives	6	
	Total		64

VI. Plant and Soil Technology Curriculum (Landscape and Nursery Management)

The Landscape and Nursery Management program is offered cooperatively by the Department of Plant and Soil Sciences of the University of Maine at Orono and the Southern Maine Vocational Technical Institute of South Portland. Students may enroll and take their freshman year at either the University of Maine at Orono or at the Southern Maine Vocational Technical Institute. The second year of the program is taken at Orono and the student receives an associate of science degree from the University of Maine at Orono.

The curriculum focuses on preparing the student for designing and interpreting landscape plans; planting and cultivating trees, shrubs, and flowers; building and maintaining lawns;

constructing landscape features including walks, paths, small pools, and walls; and the production, harvesting and sale of ornamental plants. The program also provides a background in mathematics, English and those areas important to businessmen dealing with the public. All Students in the program are required to earn four credit hours of specialized on-the-job training before graduating from the program.

Required Courses			Required Hours
A. 1 LSA	Seminar in Plant & Soil Tech.		1
B. COMMUNICATIONS			9
3 Eng	Critical Written Expression	3	
4 Eng	Speech	3	
5 Eng	Technical Writing	3	
C. MATHEMATICS			3
13 LSA	Applied Mathematics	3	
D. HUMANITIES & SOCIAL SCIENCES			6
5 Pol	State and Local Government	3	
	Elective	3	
E. BASIC SCIENCES			6
1 Bt	Introductory Botany	3	
1 En	Applied Entomology	3	
F. APPLIED SCIENCES			36
15 LSA	Placement Training	4	
7 AE	Landscape Machinery	3	
11 AE	Soil and Water Management	3	
7 P	Landscape Design	3	
8 P	Turfgrass Management	3	
10 P	Landscape Construction	3	
11 P	Nursery and Garden Center Operations	3	
2 S	Soil and Fertilizers	4	
P 30	Ornamental Horticulture*	3	
P 31	Landscape Plant Material*	3	
P 33	Greenhouse Management*	4	
G. ELECTIVES			6
	Total		67

*See plant and soil sciences section for course descriptions.

VII. Resource and Business Management Curriculum

This curriculum places major emphasis on the principles of business management and economics and provides practical training in preparation for business management careers in the food and fiber industries and recreation industries. The training in business management includes courses in economics, marketing, accounting, data processing, statistics, sales promotions, and business management.

Students will be prepared for managerial, supervisory, sales, and service positions with business firms and government agencies. Opportunities are available in such fields as finance, feeds, farm machinery, food processing, food inspection, retail food stores, floral stores, wholesale nurseries, golf courses, and campgrounds.

Students will have the opportunity to apply for placement training with a business firm in Maine as an integral part of their academic program. Students who apply for the placement training must be accepted by a committee composed of merchants and faculty. Students selected for this option will spend approximately six months working in a management training program away from campus. For successful completion of this program, students receive up to 16 hours of academic credit. This program takes place during the summer and fall following the first year on campus. Students not electing this option remain on campus in regular academic classes. Both groups complete their programs in two academic years.

The previous two-plus-two program in this degree curriculum has been replaced by an option known as Track Two. To qualify for this option, a student must have completed 30 credit hours in the program with a grade point average of at least 2.5. Students electing the Track

Two Option complete the second year of the associate degree program in transition to the Agricultural and Resource Economics BS degree program. Upon successful completion of the Track Two Option, the student receives an associate degree and qualifies for transfer to the BS degree program in Agricultural and Resource Economics which may be completed in four additional semesters or a total of four years.

Resource and Business Management Curriculum*

Required Courses		Credit Hours	Required Hours
A. SEMINAR IN RESOURCE AND BUSINESS MANAGEMENT			
1 LSA		1	
B. COMMUNICATIONS			9
3 Eng	Critical Written Expression	3	
4 Eng	Speech	3	
5 Eng	Technical Writing	3	
C. MATHEMATICS			3
13 LSA	Applied Mathematics	3	
D. SOCIAL SCIENCE			9
6 ARE	Dynamics of Human Behavior	3	
7 ARE	Sociology and the Individual	3	
	Humanities or Social Science Elective	3	
E. BUSINESS AND ECONOMICS			18
2 ARE	Economics	3	
4 ARE	Marketing	3	
8 ARE	Accounting	3	
12 ARE	Statistics	3	
20 ARE	Business Management	3	
22 ARE	Data Processing	3	
ELECTIVE COURSES			24
Total Hours			**64**

TECHNICAL COURSE DESCRIPTIONS

AGRICULTURAL AND RESOURCE ECONOMICS (ARE)

2. Economics—Economic principles applied to the economy as a whole and to the business firm. Consideration will be given to money and banking, government, demand, supply, competition and pricing. Rec 3, Cr 3.

3. Farm Management—Managing the farm business for optimum returns; economic guides to decision making; management tools and their application; organizing resources for production; adjustments to change. Rec 3, Cr 3.

4. Marketing—Marketing and the basic activities involved in this function of modern business. Covers theoretical principles, consumer and product characteristics, trade practices, market channels, and the improvement of markets and marketing. Rec 3, Cr 3.

6. Dynamics of Human Behavior—The applications of social psychology. Five major areas covered: social basis of personality, status-roles, socialization, development of meanings and the individual and the group. Work situations involving human relationships, leadership, and supervision. Rec 3, Cr 3.

7. Sociology and the Individual—The relationship of the individual to the social systems of society. A social problem orientation is presented with emphasis on the understanding of deviant social systems. Social problems of importance in life and work are discussed. Rec 3, Cr 3.

8. Accounting—The principles and procedures used in the preparation of balance sheets and income statements. Deals with the systematic recording, classifying, and analyzing of business transactions. Preparation and presentation of accounting information. Rec 2, Lab 2, Cr 3.

10. Sales Promotion—The use of advertising, sales and merchandising techniques. Training of sales and service personnel. Case studies are used to develop an interdisciplinary approach to promotion. Rec 3, Cr 3.

12. Statistics—The nature and use of statistics, including methods of collecting, organizing, interpreting, and reporting data for business management decisions. Measurement of central tendency, trends and relationships, sampling variability, and quality control. Rec 2, Lab 2, Cr 3.

14.15. Independent Studies in Business Management—Analysis of and readings on current management problems in production, processing, distribution, and marketing. Prerequisite: permission of instructor. Cr 1.

20. Business Management—Forms of business organization, economic framework, the managerial functions, managerial decision making and concepts of managerial economics are presented in light of the needs of a firm. Rec 3, Cr 3.

22. Data Processing—Introduction to the principles and techniques of electronic data processing including history and progression in types of data processing equipment, principles of the components and operations of computers, introduction to programming languages with emphasis on FORTRAN, and practical application are included. Rec 3, Cr 3.

AGRICULTURAL ENGINEERING (AE)

5. Power Technology—Construction principles and maintenance of spark ignition and diesel engines, power transmission as related to agricultural and forestry equipment. Rec 2, Lab 2, Cr 3.

7. Landscape Machinery—Principles of construction, operation and adjustment of tractors and machines used in landscape management. Economics related to cost and management of mechanized operations. Laboratory includes test and adjustment of small engines and related equipment. Rec 2, Lab 2, Cr 3. (PST majors only)

8. Farm Machinery—Principles of construction, operation and adjustment of machines used in agricultural production. Economic principles related to cost and management of mechanized operations. Laboratory work includes testing and adjustment of several agricultural machines and related equipment. Rec 2, Lab 2, Cr 3.

9. Farm Buildings—Functional planning and economic considerations, materials, methods of construction and environmental control for production, processing and storage buildings. Rec 2, Lab 2, Cr 3.

10. Electrification—Electrical terms and circuits. Electrical equipment for heat and power. Basic wiring techniques including planning of wiring systems. Rec 2, Lab 2, Cr 3.

11. Soil and Water Management—Elementary Soil and Water Conservation Engineering and Farm Surveying. Application of soil erosion control systems, drainage systems, farm ponds, and irrigation systems to field problems in agriculture and landscaping. Rec 2, Lab 2, Cr 3.

15. Refrigeration Technology—The principles, selection, and operation of refrigeration unit and materials handling equipment associated with refrigerated storages and transportation. Rec 2, Lab 2, Cr 3.

16. Forest Machinery Systems—Vehicles and mobility, hydraulic systems, and economics of forest equipment operation. Rec 2, Lab 2, Cr 3.

ANIMAL SCIENCE (AnV)

1. Dairy Cattle—Practical application to herd management of lactation, environment, reproduction, sanitation, housing, and breed association programs. Laboratory devoted to practical problems in the management of a herd of dairy cattle. Field trip fee $6.00. Rec 2, Lab 2, Cr 3.

2. Animal Production—Breeds and types of beef cattle, sheep, swine and pleasure horses; their care, feed, and management. Field trip fee $9.00. Lec 2, Lab 2, Cr 4.

3. Animal Selection—A study of the principles of animal selection. Lec 1, Lab 2, Cr 2.

4. Animal Breeding—Animal genetics, systems of breeding and principles of selecting farm and laboratory animals. Lec 3, Cr 3.

6. Animal Feeding—A study of the principles of nutrition, feeds and their values, and the nutritive requirements of animals. The laboratory is devoted to the principles of nutrition and ration formulation; one section for farm animals and one section for laboratory animals. Lec 2, Lab 2, Cr 3.

7. Poultry Production—A survey course to introduce students to the many aspects of the poultry industry. Guest speakers and field trips (which are part of laboratory) to visit the industry are featured. Lecture section may be taken without laboratory. Field trip fee $8. Lec 3, Cr 3 or Lec 3, Lab 2, Cr 4.

8 IDL. Meat and Meat Products—Methods of handling and preparing livestock for market, packing house methods, cutting and curing of meats with special emphasis on retailing of meat and poultry products. Laboratory fee of $5. Lec 2, Lab 2, Cr 3.

9. Mammalian Anatomy and Physiology—A descriptive course covering the structure and function of tissues, organs and systems of common laboratory and domestic animals. Laboratory space limited. Priority to Animal Medical Technology students. Lecture section may be taken without laboratory. Lec 3, Lab 2, Cr 5.

11. Animal Nutrition—A course designed to orient the student to the basic principles of nutrition as they apply to such monogastric animals as chicks, rats, mice, guinea pigs, hampsters, dogs, cats, pigs, rabbits, swine and horses and such ruminant animals as goats, sheep and bovines. Lec 2, Cr 2. (AMT students only)

12. Reproduction and Breeding—The principles and practices of the complete reproductive cycles of breeding management, by species, of farm animals (for AT) or pets and laboratory animals (for AMT). Lec 2, Lab 2, Cr 3.

13. Large Animal Care and Handling—A course designed to familiarize the student with handling, restraining, sampling and medicine administration of common large animals encountered in veterinary practice. Lec 2, Lab 2, Cr 3.

14. Laboratory Animal Care—The principles and problems associated with animal care in clinics, hospitals and research laboratories. Animal house design, equipment and management problems will be discussed. Characteristics of individual animal species will be studied. Lec 2, Lab 2, Cr 3.

15. Livestock Diseases—Principles of hygiene and sanitation applied to the prevention and control of the common diseases of dairy cattle. Lec 3, Cr 3.

16. Animal Genetics—Principles of animal genetics with emphasis on the dog, cat and horse. Lec 2, Cr 2.

19. Laboratory Animal Diseases—Principles of disease prevention and control as they apply to common laboratory rodents, carnivores and primates. Lec 3, Cr 3.

20 IDL. Basic and Pathogenic Microbiology—The basic principles of Microbiology involving the cultivation, separation, identification and control of microorganisms. The identification of pathogens will be stressed. Lec 3, Lab 2, Cr 5.

21.22. Problems in Animal and Poultry Production—Cr Ar.

23. Clinical Laboratory Methods—A descriptive and familiarization course of current laboratory procedures used in veterinary medicine. Technical procedures in urinalysis, hemotolgy, clinical chemistry, instrumentation and parasitology will be covered. Lec 2, Lab 2, Cr 3.

24. Laboratory Methods Practicum—A descriptive and laboratory course studying animal clinical procedures in microscopy, urinalysis, hematological methods, blood analysis, and basic instrumentation. Lec 3, Lab 2, Cr 4.

25. Purchasing—The work rotation through the Purchasing/Central Supply and Inventory section and the lectures acquaint the student with the concepts of the purchasing function in a veterinary practice. Cr 2.

26. Client Relations/Hospital Finance—The student will be involved in client contact in order to develop a professional approach to public relations and client handling. The student will be exposed to financial arrangements, billing, record keeping and collection procedures. Cr 4.

27. Medicine—The work rotation enables the student to gain practical experience by functioning in a clinical situation as part of the client-patient-veterinarian-technician relationship. The student also participates in basic nursing procedures of hospitalized patients which includes taking samples for laboratory analysis, administration of medications and intensive care. Cr 4.

28. Surgery/Radiology—Surgery and radiology lectures and laboratory periods, prepare the student for work rotation through the prep room, surgery suites, care of surgical patients postoperatively and operation of the X-ray facility. Cr 4.

29. Pathology—Gross pathology lectures provide a basic understanding of disease processes. Basic terminology is discussed and defined and examples are provided by slides. Necropsy wet labs enable the student to study the end result of the disease process of fresh post-mortem specimens. Clinical pathology lectures and laboratory experience acquaint the student with advanced laboratory procedures. Cr 2.

FOREST RESOURCES (Fy)

2. Applied Silviculture—Practices and basic concepts in the regeneration management and cultural treatments of forest stands in order to produce desired timber crops and recreational and other forest values. Field practice in planting, thinning, weeding and pruning and observation of various harvesting methods. Lec 2, Lab 4, Cr 4.

3. Introduction to Forest Technology—A review of the development of forestry in the United States and a survey of career opportunities with emphasis on the technical level. Suggestions for setting guidelines for education and self-development. Lec 2, Cr 1.

4. Aerial Photo Interpretation—Use of aerial photographs in connection with forest inventory techniques, locating and mapping forest areas resources, and improvements. Prerequisite: 10 Fy. Rec 2, Lab 3, Cr 3.

5. Forest Measurements—Methods of estimating the cubic volume of forest trees and stands and the volumes of useful products in logs, bolts and standing trees. Determination of growth rate as a basis for management practices. Sampling procedures. Field practice in measuring logs, trees and plots. Rec 2, Lab 4, Cr 4.

6. Wood Products Utilization—A survey of the major forest products industries to give the student an understanding of how the products of the forest are utilized and marketed. Effect of wood quality requirements on forest management. Inspection trips to local wood-using plants. Prerequisite: 10 Fy. Rec 2, Lab 3, Cr 3.

7. Forest Protection—Problems involved and practices used in the prevention and control of forest fires, insects, diseases and other causes of loss or damage. Rec 2, Cr 2.

8. Seminar for Forest Technicians—Discussion of developments affecting technicians, current activities in forestry, and evaluation of training. Subjects chosen by class members. Prerequisite: TDL seniors only. Rec 1, Cr 1.

9. Forest Land Management—Land titles, surveys, owner's rights and liabilities, trespass and relations with the public. Organization and management of properties for timber production and other uses. Methods of predicting returns from investment. Prerequisite: 10 Fy. Rec 2, Lab 3, Cr 3.

10. Field Training—Forest Management Technology students only. Prerequisite: 2 Fy and 5 Fy. 48 hours a week. Cr 6.

10a. Field Measurements and Inventory—Practice in several cruising methods. Locating boundaries and mapping a forest area, field work and office calculations in estimating volume. Preparation of operation report. Fire and pest control problems. Cr 2.

10b. Harvesting and Manufacturing Practicum—Practice in felling, yarding, bucking and piling, studying operation layout, supervision and safety. Observation of one or more harvesting systems. Studies at lumber and pulp and paper manufacturing plants. Marking of operation area for cutting. Cr 3.

10c. Forest Resources Field Trip—Types of recreation development and examination of specific examples. Preparation of a development plan. Wildlife in relation to forest management. Treatment of stands to produce more favorable habitat for wildlife. Cr 1.

12. Wood and Tree Identification—The identification of wood and tree species in the laboratory and field stressing those found in the forests of Maine and the Northeast. Prerequisite: 1 Bt; Lec 1, Lab 3, Cr 2.

HUMAN DEVELOPMENT

1 Cd. Introduction to Design—Selection and organization of visual elements and principles of design to create harmony in compositions and to obtain function, economy, beauty, and individuality in daily living. Rec 2, Lab 2, Cr 3.

3 Cd. Textiles in Home and Clothing—Learning to recognize quality features of fabrics and to understand labels for fiber content, functional finish, and care. Fiber properties and performance data. Fair claim policy. Names and consumer uses of fabrics. Rec 3, Cr 3.

4 Cd. Designing and Furnishing the Home—Planning functional and aesthetic qualities of the home for individual and family situations. Focus on selection, organization, and evaluation of furnishings and materials for residential interiors. Layout in floor plans and wall elevations. Rec 2, Lab 4, Cr 4.

6 Cd. Clothing the Family—Clothing and accessories for physical, social, and economic needs of various age groups. Size, cut, fit, construction, and price level. Hanger appeal and combining value in the wardrobe. Studies of consumers' satisfaction. Rec 3, Cr 3.

7 Cd. Commercial and Advertising Design—Creation of visually stimulating designs to focus and hold people's interest on a product, service, or idea. Problems in visual communication such as trademarks, advertisements, posters, package designs, and displays. Lettering, illustration, layout. Rec 1, Lab 4, Cr 3.

8 Cd. Fashion Merchandising—Sources of fashion with charting of trends. Promotion of fashion in home furnishings and clothing. Comparative shopping and evaluation of perishability. Rec 3, Cr 3.

PLANT AND SOIL SCIENCES (P; S)

1 P. Potato Production—Production of potatoes for seed, tablestock and processing. Rec 2, Lab 2, Cr 3.

3 P. Forage Management—Production of hay, silage, and pasture crops. Selection of seeding mixtures, establishment of forage seedings; use of lime and fertilizers to maintain forage productivity. Pasture management; harvesting and preservation of hay and silage. Rec 2, Lab 2, Cr 3.

7 P. Landscape Design—The principles of landscape design as applied to selected problems. The course is designed to prepare students for situations similar to those in the industry. Rec 2, Lab 2, Cr 3.

8 P. Turfgrass Management—The characteristics, soil and environmental adaptation, propagation, specific uses and management requirements of grasses for turf. Identification, fertilizing, clipping, watering and controlling weeds, insects, and diseases of turf grasses. Renovation and construction of turf areas by seeding and sodding. Rec 2, Lab 2, Cr 3.

10 P. Landscape Construction—Techniques and use of construction materials in landscaping. Emphasis on the basic knowledge and skills needed for planning and constructing terraces, steps, walls, fences, site furniture, decks, irrigation design and paving materials. Rec 2, Lab 2, Cr 3.

11 P. Nursery and Garden Center Operations—A course in nursery and garden center management designed mainly to acquaint students with the diversity of nursery plant production, equipment and retail store operations and grounds maintenance. Rec 2, Lab 2, Cr 3.

1 S. Fundamentals of Forest Soils—Study of the properties of forest soil with interpretations of these properties in terms of tree growth. Rec 2, Lab 2, Cr 3.

2 S. Soils and Fertilizers—Soil properties and their relation to crop production with special emphasis on management and use of commercial fertilizers. Rec 3, Lab 2, Cr 4.

SERVICE COURSES

1 LSA. Seminar in (Program Major)—A review of the major area of study and a survey of career opportunities. Rec 1, Cr 1.

13 LSA. Applied Mathematics—Use of equations, basic algebra, and graphical methods in the solution of problems in business, mechanics, agricultural production, and family and institutional management. Cr 3.

15 LSA. Placement Training—Provides "on-the-job" training in the field related to program of study. Work is to be under supervision of employer and appropriate department or school in the College of Life Sciences and Agriculture. Prerequisite: C average. Cr Ar.

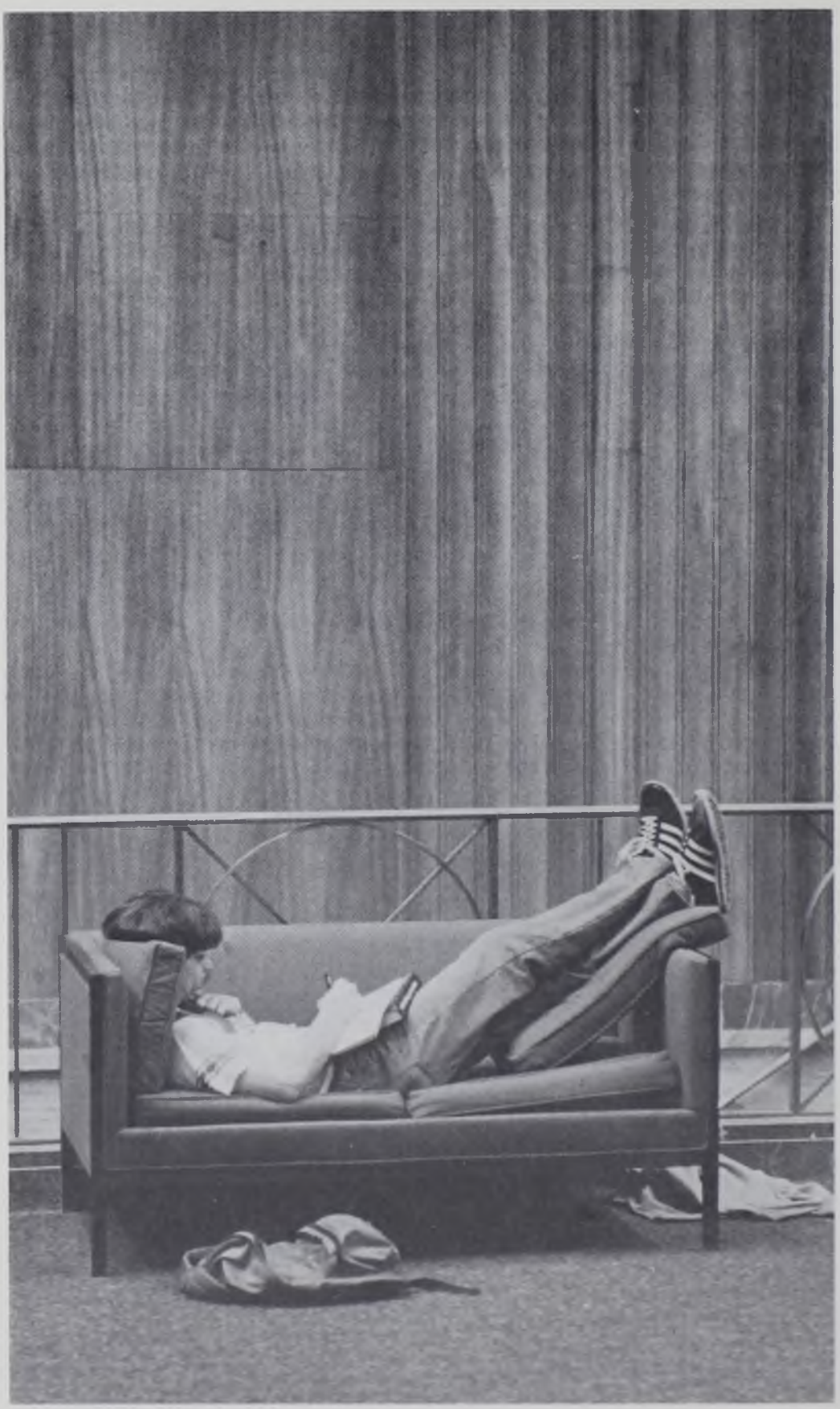
1 Bt. Introductory Botany—The structure and life processes of seed plants, their propagation, breeding, classification, and relation to their environment. Rec 2, Lab 3, Cr 3.

5 Bc. Animal Biochemistry—An introduction to the principles of inorganic, organic, and biochemistry. Rec 3, Lab 2, Cr 4.

1 En. Applied Entomology—Consideration of insect benefits and detriments to man. General structure, classification, habits, and life histories of representative pest species. Study of all phases of control with emphasis on development, use and implication of pesticides to production and marketing. Rec 2, Lab 2, Cr 3.

5 GeT. Forestry Drawing—An introduction to the basic graphical construction techniques, orthographic projection and cartography. Rec and Lab 4, Cr 2.

21 GeT. Technical Drawing—An introduction to graphic symbols and skills applied to engineering drawings. Topics include: lettering, geometric construction, multiview drawing, graphs, sections, dimensioning, and pictorial drawing. Lec 2, Lab 3, Cr 3.



Graduate School

Programs of study leading to the degrees of Master of Arts, Master of Science, Master of Engineering, Master of Arts (Teaching of French), Master of Education, Master of Business Administration, Master of Engineering, Master of Music, Master of Professional Studies, Master of Public Administration, Doctor of Philosophy and Doctor of Education are offered. Programs leading to the Ph.D. degree are available in animal nutrition, chemical engineering, chemistry, civil engineering, forest resources, history, oceanography, physics, plant science, psychology, and zoology. Doctor of Education programs are available in guidance and counseling, in the language arts, in social studies education and in science education.

The Certificate of Advanced Study, designed for teachers and school administrators, is awarded for the completion of a planned program of thirty hours of work beyond the master's degree.

Applicants who wish to work toward the degree of Master of Arts or Master of Science are ordinarily expected to have had an undergraduate major or its equivalent in the field in which they propose to do advanced work. Applicants for most programs leading to the degree of Master of Education are expected to have had sufficient work in professional education to qualify for the appropriate type of certification. Teaching experience is also ordinarily expected.

A thesis usually is required of candidates for the M.A. and M.S. degrees, and is required for the Ph.D. and Ed.D. degrees.

The catalog of the Graduate School, containing more detailed information concerning graduate programs and financial assistance, may be obtained from the Office of the Graduate School, 2 Winslow Hall, Orono.

University of Maine at Orono undergraduates who lack not more than nine semester hours toward a bachelor's degree (counting required and sequence courses), if they meet admission requirements, may register in the graduate school for limited graduate course credit while concurrently completing work for the bachelor's degree. Total enrollment for the semester may not exceed fifteen hours. The student must apply, in writing, to the Dean of the Graduate School for permission to take specified courses for graduate credit.

Continuing Education Division

The Continuing Education Division coordinates the part-time study of adults on the Orono campus and in a wide geographical area surrounding the Orono campus during late afternoon and evening classes.

The Division provides a source of continuing education for mature and qualified persons who wish to supplement an earlier education. Courses offered may sometimes be applied toward degree programs or may be primarily for professional or personal use. However, all programs offered are designed to prepare adults to meet the challenge of change and to provide experiences in learning which will lead to a fuller and richer life.

Adult students in Continuing Education Division classes have varied backgrounds and interests. Most of them carry on full-time occupations, have graduated from high school some time ago and have determined for themselves the need for earning a degree or specific courses to be used for personal or occupational development. A number of students who are recent high school graduates are beginning their college career by enrollment in C.E.D. classes.

A large variety of degree credit courses are available on the Orono campus in the program of the Continuing Education Division. Courses offered by the means of the Division may be for degree credit or non-degree credit.

Adults who wish to enroll in a C.E.D. course are encouraged to visit the C.E.D. office in Merrill Hall where C.E.D. personnel are available to advise students on course selection and registration procedures. Regular tuition charges or nominal fees are charged for programs offered.

THE BACHELOR OF UNIVERSITY STUDIES

(Offered only through the Continuing Education Division and Summer Session)

The Bachelor of University Studies presents to the highly motivated part-time adult student the opportunity to coordinate the offerings of the Continuing Education Division and Summer Session at Orono into an individually planned degree program. Approved by the faculties of all the colleges of the University of Maine at Orono, this program is designed specifically and solely for part-time adult students in the Continuing Education Division at Orono.

The program is offered for many individuals: those who did not continue directly to higher education after high school and who find that family, job, and other responsibilities do not allow a full-time program of study; those who have discontinued college or university programs and who now wish to reenter a degree program; those with associate degrees who may wish to pursue a broader based baccalaureate program.

The Bachelor of University Studies is not intended to duplicate or to displace proven current programs or offerings of the University or of other schools and colleges. The degree differs in two major respects from traditional B.A. and B.S. degrees. First, it is offered only through the Continuing Education Division at Orono and only for adults who can attend the university on a part-time basis. Second, each student, in consultation with a C.E.D. advisor, will design a program leading to specific educational goals but not necessarily within any one department, division, school, or college. It is designed to be flexible and adaptable to the needs of the individual part-time adult student.

Summer Session

The University offers a wide variety of courses during the 10-week Summer Session designed to meet the general and specific needs of educators, regularly enrolled undergraduates, and those who seek cultural and professional growth in specific fields.

Teachers and school administrators who desire to take professional courses in the field of education or to pursue other subjects which may be helpful to them in their work will find that special attention is given to teachers in the various subjects offered. Professional courses in elementary and secondary education are offered throughout the Summer Session. In addition, special workshops both in elementary and secondary education are conducted for three-week periods. Some courses are also organized on a three-week basis, thereby enabling the student who enrolls for a workshop to complete a full six-week Summer Session schedule. Several conferences on special educational problems, usually lasting a week, also are offered. A few courses are scheduled during the early evening hours to accommodate students who must be employed during the summer months.

The Summer Session offers a wide variety of academic courses to regularly enrolled students at the University of Maine at Orono and other collegiate institutions for credits toward a degree, thus enabling them to accelerate their undergraduate program. Other undergraduate students enroll in this session to make up work which they may have missed during previous semesters or to explore new fields of study.

The facilities of the Summer Session are open to both men and women, and students are admitted without examination. The requirements for admission are, in general, the same as those for the other sessions of the University. Students are expected to have completed as a minimum preparation a standard high school course or its equivalent.

As an integral part of the University organization, the Summer Session has similar standards of academic achievements. The faculty consists of members of the University staff and numerous visiting professors from other institutions.

Transcripts for work previously done are necessary only when the student plans to become a candidate for a degree at the University of Maine. New students who expect to become candidates for the master's degree should communicate with the Dean of the Graduate School.

Classes meet five times a week. Monday through Friday. The normal registration for the six-week session is for two or three courses.

The Summer Session begins in mid-June and ends in mid-August. The bulletin describing courses offered during this period is issued about March 15. For further information concerning the program address Director of the Summer Session, 14 Merrill Hall, University of Maine, Orono, Maine 04469.

Canadian Studies

Canadian Studies is an undergraduate program at the University of Maine at Orono. The most comprehensive program in the United States, it can take the form of either a concentration or minor, depending on the college of an individual student. The program is administered by the Canadian-American Center, Canada House, 160 College Avenue.

The program is interdisciplinary and designed to appeal to students in many fields who have an interest in Canada. The major prerequisite is CAN 1, Introduction to Canadian Studies. The course acquaints freshmen and sophomores with varied aspects of the Canadian experience: society, culture, history, native peoples, environment, education, technology, economy, and diplomacy. Participating faculty include Canadian-American Center staff, visiting scholars from Canada, and faculty members from the several UMO colleges.

In order to complete the concentration students must take 18 hours of the courses listed below, including CAN 1 and nine additional hours of Canadian core courses. Other UMO courses may also be considered for application to the program, as well as courses taken at Canadian universities through the Canada Year program of the Canadian-American Center.

For the last thirteen years the Center has sent students in the Canada Year program from Orono to Canadian universities. In past years UMO students have studied at the University of Toronto, McGill University, l'université Laval, University of New Brunswick, Dalhousie University, Acadia University, University of Prince Edward Island, and Memorial University of Newfoundland, University of British Columbia, Simon Fraser University, University of Victoria, University of Calgary, York University, University of Guelph, l'université de Sherbrooke, l'université du Québec à Chicoutimi, and Carleton University.

Although the program in the past was designed only for junior year students, the Canadian-American Center will now accept applications from sophomores and first year seniors as well. It should be noted that while participation in Canadian Studies is not a prerequisite to the Canada Year program, applications from students in Canadian Studies will be given preference by the selection committee.

Some of the best universities in North America will accept Maine students selected by the Canadian-American Center. There are many academic reasons for students to become involved. Study in Canada allows a student to strengthen his or her major by adding courses not offered at Orono and to live in an area with a different culture or language.

Students who are considering graduate study on Canada should contact the Center regarding the M.A. and Ph.D. programs at the University of Maine at Orono.

Courses with a 200 number are for selected undergraduates and graduate students.

Canadian Core Courses

CAN 1	Introduction to Canadian Studies
CAN 100	Seminar in Canadian Studies
At 197	Canadian Art History
Ay 122	Folklore of Maine and the Maritime Provinces
Ay 160	Peoples and Cultures of the Circumpolar Area
Ay 190	French Canadian Immigration
Eh 135	Canadian Literature
Eh 215	Literature of Maine and the Atlantic Provinces
Fl 97	French May Term in Quebec City
Fr 54	Quebec in Transition, 1960-Present
Fr 56	French Canadian Civilization
Fr 152	The Novel of Quebec
Fr 156	Seminar in Quebec Studies
Fr 252	Films, Video Drama and Literature in French Canada
Fr 250	Seminar in French Canadian Literature and Language
Geo 150	Geography of Canada
Hy 157	France in America to 1763
Hy 158	History of Quebec and Franco-America
Hy 159	History of Canada to 1850
Hy 160	History of Canada since 1850
Hy 221	Canada and the United States
Hy 222	Canadian Economic History

IDL 237	Evolution and Development of Canadian Government and Politics
Sy 131	Canadian Society

Canadian Related Courses

Ay 21	Introduction to Folklore
Ay 125	Oral History and Folklore
Ay 151	North American Indian Ethnology
Ay 172	North American Prehistory
Ay 270	Seminar in Northeastern North American Prehistory
Ba 166	International Marketing
Ba 199	International Management
Ec 139	International Trade and Commercial Policy
Ec 145	Regional Economics
Fa 140	Franco-American Civilization
Geo 101	Historical Geography of North America
Gy 243	Quaternary History of Northeastern North America
Jr 42	The Foreign Press
Pol 187	International Law

For complete details about the Canadian Studies concentration, contact the Canadian-American Center, Canada House, 160 College Avenue.

Institute for Quaternary Studies

Professor Harold W. Borns, Jr. (Director)—Quaternary and Glacial Geology; Professor Ronald B. Davis - Paleoecology-Limnology; Professor George H. Denton - Quaternary and Glacial Geology; Professor David Sanger - Archaeology; Associate Professor Robson Bonnichsen - Archaeology; Associate Professor Terence J. Hughes - Glaciology; Associate Professor Detmar Schnitker - Marine Geology - Micropaleontology; Assistant Professor Thomas B. Kellogg - Marine Paleoclimatology and Sedimentation; Faculty Associate Davida E. Kellogg - Marine Microbiologist and Ecologist; Faculty Associate Robert Stuckenrath - Radiocarbon Dating.

The Quaternary Period, the most recent in earth history, witnessed numerous climatic fluctuations, glaciations, sea-level changes, and shifts in distributions of organisms. These changes shaped our contemporary environments and strongly influenced the evolution of man. A knowledge of Quaternary events facilitates understanding of current environmental changes and may enable anticipation of future changes. Maine was particularly affected by Quaternary events, because its landscape was shaped largely by glaciation and its biota was influenced strongly by climatic change.

Quaternary studies are often interdisciplinary and thus require cooperation among several academic departments. To facilitate such cooperation an Institute for Quaternary Studies, dedicated to teaching and research, has been established at the University of Maine at Orono. The Institute is staffed by members of the Departments of Anthropology, Botany and Plant Pathology, Geological Sciences and Oceanography. The Institute is not a formal academic department. Rather, it serves to organize and promote interdepartmental teaching and research related to Quaternary studies.

Academically, the main purpose of the Institute is to offer a master of science in Quaternary studies degree.

Research interests of staff members focus on historically oriented problems of the Quaternary. These research interests overlap and complement each other to a degree which insures cooperation and encourages interdisciplinary approaches and joint research projects. Graduate students may pursue interdisciplinary thesis projects and may be supervised jointly by several staff members. Although much Institute research is conducted in New England and adjacent Canada, projects are also current in Alaska, Yukon Territory, Lapland, northwestern Europe, and Antarctica.

QUATERNARY SETTING OF MAINE

Ice sheets covered Maine repeatedly during the Quaternary. Drift deposited by the last ice sheet, which withdrew from Maine 12,000 to 14,000 years ago, is particularly well preserved. The coastal region displays widespread marine sediments, extensive systems of large stratified moraines, small washboard moraines, and raised deltas and strandlines. Eskers, ice-disintegration deposits composed of till, fluted till sheets, ice-contact stratified drift, outwash, and periglacial features characterized the inland landscape. In addition, the Longfellow Mountains in northwestern Maine contain numerous cirques and other features of glacial erosion. A well-dated framework of Quaternary events in Maine provides a base for detailed studies of glacial and periglacial deposits, glacial and postglacial events, and sea-level changes.

Maine's numerous lakes and bogs afford widespread opportunities for research in Quaternary paleoecology. Fossils in lake sediments record ecologic changes since the last glaciation. The earliest terrestrial vegetation included a high proportion of tundra plants. As the climate became warmer, the vegetation was characterized first by closed forests of spruce and pine and later by more southern trees such as hickory. Climatic cooling during the most recent 3000 years has offered competitive advantage to northern forms. Present-day isolated populations of *Rhododendron maximum* and the marine sponge, *Microciona prolifera*, probably are vestiges of the earlier warm period, whereas arctic species on high mountains and along the coast probably have survived in special environments in Maine since late-glacial time.

Prehistoric remains in Maine are largely unstudied and research opportunities in archaeology span all periods in a variety of ecological systems. The earliest cultural record consists of scattered surface finds of Paleo-Indian fluted points which probably date to at least 10,500 years ago. The lengthy Archaic stage is best known from cemeteries of the Laurentian tradition which are located both in coastal and interior environments. Late Archaic remains are common along the coast and apparently represent the beginning of an intensive maritime exploitation pattern which was dependent largely on shellfish. Current research involves excavation and analysis of habitation sites in order to define the range of settlement and subsistence patterns. In several research projects Quaternary specialists are cooperating to provide environmental data pertinent to the prehistory of Maine.

GRADUATE AND UNDERGRAUATE PROGRAMS

The Institute for Quaternary Studies offers the degree of master of Science in Quaternary Studies. This is an interdisciplinary program which, along with concentration on one area, includes an integrated course structure involving 1) marine paleoenvironments and paleoecology, 2) terrestrial and lacustrine paleoenvironments and paleoecology, 3) environmental archaeology, and 4) glacial geology and glaciology. The "core curriculum" (see courses in Quaternary Studies) is designed to familiarize every Quaternary student with the goals and principles of the interdisciplinary approach to research. The Master of Science program is sufficiently flexible to permit an interdisciplinary course structure tailored to the needs of the individual student. A thesis is required which embodies original research in one or more disciplines included in the Institute.

The course structure provided by the Institute offers undergraduate students a unique opportunity to obtain interdisciplinary training providing a base to pursue graduate work in fields related to Quaternary studies. Interested and qualified upperclass undergraduate students may enroll in most of the courses listed below and thus may accumulate a minor concentration of Quaternary studies.

COURSES IN QUATERNARY STUDIES

Courses in Core Curriculum:

The Ice Age and Mankind (IDL 239)
Deep Sea Stratigraphy and Paleoecology (IDL 268)
Late Quaternary Paleoecology (IDL 245)
Models in Archaeology (Ay 276)
Glacial Geology (Gy 241)
Seminar in Quaternary Studies (IDL 240)

COURSES FOR QUATERNARY DISCIPLINES

1. **Marine Paleoenvironments and Paleoecology**

Late Quaternary Marine Paleoecology and Paleo Oceanography (IDL 125)
Marine Geology (IDL 260)
Micropaleontology (IDL 266)
Actuopaleontology (IDL 267)
Sedimentology (Gy 232)
Chemical Sedimentology (Gy 222)
Introduction to Mathematical Statistics
Introduction to Computer Science

2. **Terrestrial and Lacustrine Paleoenvironments and Paleoecology**
   1. **Sedimentology (Gy 232)**
   2. **Chemical Sedimentology (Gy 222)**
   3. **Low Temperature-Pressure Geochemistry (Gy 221)**
   4. **Limnology Field Studies (Bio 168 L)**
   5. **Introduction Psychology (Bt 163)**
   6. **Seminar in Ecology (IDL 340)**
   7. **Introduction to Mathematical Statistics-I (Ms 131)**
   8. **Introduction to Computer Science-I (Ms 181)**
3. **Environmental Archaeology**
   1. **Analytical Techniques in Archaeology (Ay 178)**
   2. **Laboratory Techniques in Archaeology (Ay 179)**
   3. **Seminar on Northeastern North American Prehistory (Ay 270)**
   4. **Advanced Topics in Anthropology (Ay 297)**
   5. **Introduction to Mathematical Statistics-I (Ms 131)**
   6. **Introduction to Computer Science-I (Ms 181)**
4. **Glacial Geology and Glaciology**
   1. **Sedimentology (Gy 232)**
   2. **Chemical Sedimentology (Gy 222)**
   3. **Quaternary Environments and Climate Change (Gy 242)**
   4. **Glaciology (Gy 244)**
   5. **Low Temperature-Pressure Geochemistry (Gy 221)**
   6. **Introduction to Computer Science-I (Ms 181)**
   7. **Surveying**
   8. **Tectonophysics (Gy 230)**

FINANCIAL ASSISTANCE AND ADMISSION

Application forms and information on graduate fellowships and traineeships may be obtained from:

Donna B. Evans, Acting Dean
Office of the Graduate School
University of Maine at Orono
Orono, Maine 04469

Information on graduate teaching and research assistantships and further information about graduate and undergraduate programs in Quaternary studies may be obtained from:

Dr. Harold W. Borns, Jr.
Institute for Quaternary Studies
University of Maine at Orono
Orono, Maine 04469

Undergraduate application forms for admission to the University at Orono may be obtained from:

Mr. James A. Harmon
Director of Admissions
Alumni Hall
University of Maine at Orono
Orono, Maine 04469

Department of Physical Education and Athletics

Professor Westerman (Director); Associate Professors Styrna, Walkup; Assistant Professors Anderson, Carville, Jordan; Lecturers Ames, Ballinger, Bicknell, Burger, Campbell, Chappelle, Collilouri, Davis, Folger, Fox, P. Gavett, S. Gavett, Kempa, Martino, Maser, Mateja, Miller, Semler, Switzer, Wallace, Winkin, Wren

The department offers programs in physical education, intercollegiate athletics, intramural sports, and related club activities. These programs are recognized as an integral part of the educational process which the University supports and controls within the limitations of budget, staff, equipment, and facilities. Our goals are to promote educational leadership, physical fitness, opportunity for recreational pursuits, and athletic excellence through instruction and competition. Through these programs, students are offered an opportunity to participate in leisure-time activities and life-time sports, each seeking his individual level of performance as a unique educational experience. All students are strongly encouraged to participate.

Immediate responsibility for instruction, supervision, and guidance in this area rests with the Department of Physical Education and Athletics, a department comprising four divisions: the Division of Men's Athletics, the Division of Women's Athletics, the Division of Physical Education, the Division of Recreational Athletics.

PHYSICAL EDUCATION FOR MEN AND WOMEN INSTRUCTIONAL PROGRAM

The Department of Physical Education and Athletics offers PE 1, Physical Education, 1 hour credit, and PE 2, Physical Education, 1 hour credit, on a pass-fail basis. For each hour of credit, two hours of instructional time per week, per semester, is required. Each college within the University system accepts credits for Pe 1 and Pe 2 as an elective course.

The instructional program for men and women is designed to provide the student with an opportunity to develop and refine and to add knowledge in a variety of physical activities which the student can use now and in his leisure time in later years. Emphasis is placed on presenting the student with an appreciation and understanding of the body and its movement, of exercise and its role in one's individual life. In an effort to promote and maintain one's individual physical fitness, each woman or man has the opportunity to select those activties in which she or he has an interest.

The program will include a choice of activities; dance, golf, physical fitness, racquet sports, swim, tennis. From these choices the students may either choose for depth in skill refinement in an activity or breadth in selection of several activities.

INTERCOLLEGIATE ATHLETICS MEN AND WOMEN

As an integral part of the University's program of physical education, intercollegiate athletics help to serve the general purposes of that program. In addition, they constitute an effective means of maintaining interest in all-round physical fitness; they set standards of excellence in physical efficiency; they provide a wholesome and natural common interest around which University loyalties may be rallied and institutional esprit developed; and they afford experience in emotional control and in the capacity to think quickly and act vigorously while under the pressure of strong opposition.

Regular schedules are arranged and provide for competition in the following sports: baseball, basketball, cross country, football, field hockey, golf, gymnastics, ice hockey, riflery, sailing, soccer, skiing, swimming, tennis, track, volleyball, wrestling.

FACILITIES

The University facilities for athletics and physical education are listed under buildings in the General Information section.

Public Radio and Television

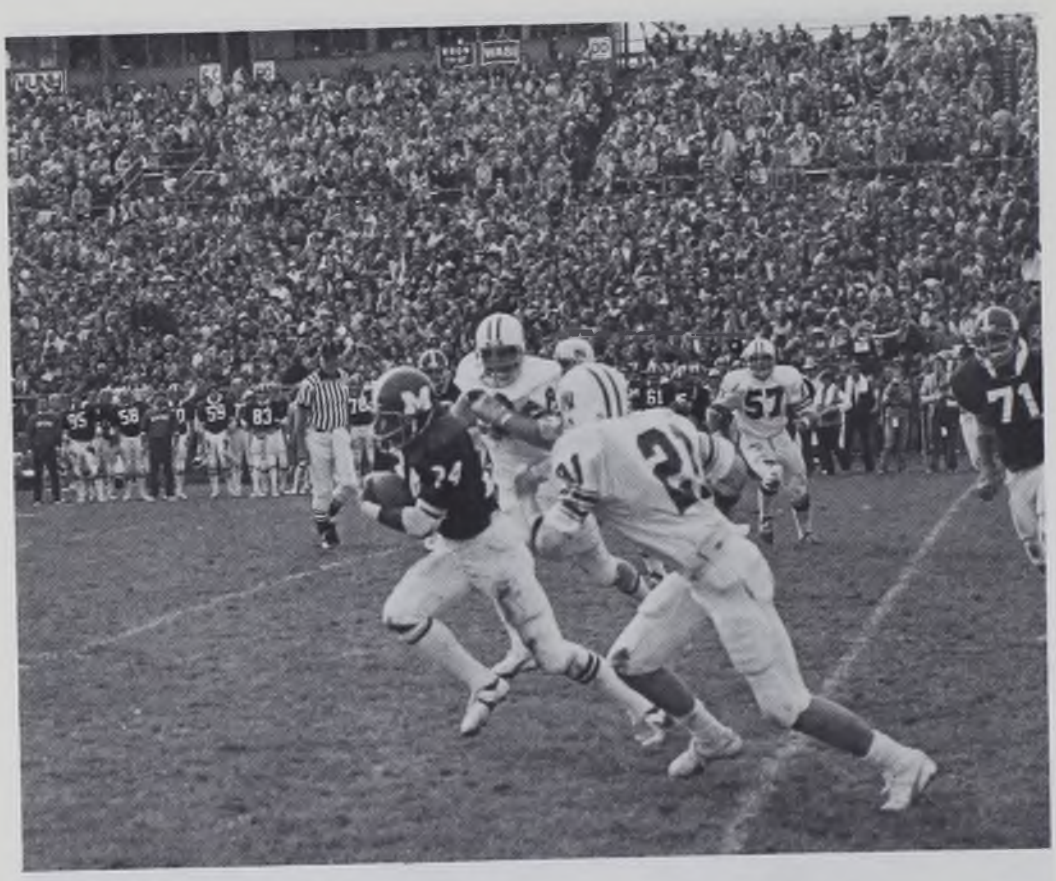
Public radio and television stations across the country are noted for their fine drama, news and public affairs, and music. Maine's public broadcasting system is recognized for the same incomparable programming.

Licensed to the University of Maine Board of Trustees, the Maine Public Broadcasting Network (MPBN) owns seven non-commercial radio and television stations in Southern, Central, Eastern and Northern Maine. MPBN's signal covers Maine, three New England states and two Canadian provinces.

Headquartered on the University's Orono campus in Alumni Hall, MPBN operates three radio stations: WMEH (FM 90.9) Bangor, WMEA (FM 90.1) Portland, and WMEM (FM 106.1)Presque Isle. Its television stations are: Channel 12 (WMEB-TV) Orono, Channel 10 (WMEM-TV) Presque Isle, Channel 13 (WMED-TV) Calais, and Channel 26 (WMEG-TV) Biddeford. The network is a member of the Public Broadcasting Service (PBS), National Public Radio (NPR), and several other regional organizations.

Aside from its national program schedule, which includes such all-time favorites as Masterpiece Theatre and Washington Week in Review (television), All Things Considered and Options in Education (radio), MPBN produces an outstanding array of local programs. Several, in fact, have won national recognition for their creative and technical excellence. In addition to these programs, MPBN broadcasts six hours of instructional television programming for use by Maine schools each weekday, and adult education programs as well.

The network's radio and television operations offer students an excellent opportunity for part-time employment and training in broadcasting.



Faculty

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Bailey, Russell Manley (1931-1967); B.S., Maine, 1928; Associate Professor Emeritus of Genetics.

Baker, Gregory (1935-1968); B.S., Maine, 1924; M.F., Yale, 1939; Professor Emeritus of Forestry.

Barden, Albert Arnold, Jr. (1946-1976); A.B., Brown, 1932; Sc.M., 1934; Ph.D., Northwestern, 1941; Professor Emeritus of Zoology.

Bates, Edwin H. (1953-1980); B.S., Maine, 1937; M.S., University of Wisconsin, 1961; Extension Director Emeritus and Extension Educator.

Beamesderfer, John William (1947-1976); B.S., Gettysburg College, 1932; M.S., University of Michigan, 1939; Ph.D., 1947; Professor Emeritus of Chemistry.

Bennett, Clarence Edwin (1934-1970); Ph.B., Brown, 1923; Sc.M., 1924; Ph.D., 1930; Professor Emeritus of Physics.

Beverly, Verne Curtis (1923-1956); B.S., Maine, 1920; County Agent Emeritus.

Beyer, Frank Kemp (1947-1968); B.S., Cornell University, 1929; M.S., University of Wisconsin, 1930; Associate Professor Emeritus of Forestry.

Bird, Francis H. (1961-1978); B.S., University of Michigan, 1936; Ph.D., University of California (Berkeley), 1948; Professor Emeritus of Poultry Science.

Biscoe, Jonathan (1946-1973); B.S., Massachusetts Institute of Technology, 1931; M.S., 1932; Professor Emeritus of Physics.

Bissell, Lewis Prouty (1949-1976); B.S., New Hampshire, 1940; M.F., Yale, 1947; Associate Extension Educator; Emeritus.

Bogan, Edgar Junior (1929-1968); A.B., Miami (Ohio), 1926; A.M., Princeton, 1929; Ph.D. Ohio State, 1947; Professor Emeritus of Chemistry.

Bricker, Herschel Leonard (1928-1970); A.B., Coe, 1928; Professor Emeritus of Speech.

Briwa, Kathryn Elizabeth (1941-1960); A.B., Vassar, 1915; M.A., Columbia, 1929; Ph.D., 1940; Extension Nutrition Specialist Emerita.

Brockway, Philip J. (1935-1974); B.A., Maine, 1931; M.A., 1940; Director Emeritus of Career Planning and Placement.

Brown, Ella C. (1962-1978); B.S., University of Missouri, 1949; M.A., Montana State University, 1961; Associate Professor Emerita of Education.

Brugman, Herman Henry (1950-1974); B.S.A., University of Manitoba, 1944; M.S., University of Minnesota, 1947; Ph.D., 1948; Associate Professor Emeritus of Animal Sciences.

Brush, Edward Newcomb (1928-1970); A.B., Vermont, 1925; A.M., Harvard, 1926; Ph.D., 1932; Professor Emeritus of Psychology.

Brush, Lillian H. (1931-1954) (1961-1968); B.A., Lake Forest College, 1923; M.A., University of Illinois; Ph.D., Cornell University, 1928; Lecturer Emerita in Psychology.

Campbell, Ashley S. (1968-1979); B.S., Harvard University, 1940; M.S., 1947; Sc.D., 1949; Professor Emeritus of Mechanical Engineering.

Carpenter, Paul N. (1946-1975); B.S., Maine, 1939; M.S., 1949; Associate Professor Emeritus of Agronomy.

Cassidy, Margaret Eileen (1937-1973); Diploma, Sargent School of Physical Education, 1928; B.S. in Ed., Maine, 1939; Associate Professor Emerita of Physical Education.

Caughran, Alex Madison (1953-57); B.A., Drury College, 1937; M.Ed., University of Missouri, 1949; Ed.D., 1953; Professor Emeritus of Education.

Chute, Harold L. (1949-1979); D.V.M., University of Toronto, 1949; V.S., Ontario Veterinary College, 1949; M.Sc., Ohio State University, 1953; D.V.Sc., University of Toronto, 1955; Director of Development and Professor Emeritus of Animal Pathology.

Clayton, Mary M. (1934-1956); B.S., Columbia University, 1918; M.S., University of Rochester, 1925; Ph.D., 1928; Nutritionist Emerita, AES.

Comegys, Esther (1941-1960); B.A., Wellesley, 1921; M.A., University of Pennsylvania, 1926; Ph.D., Radcliffe, 1941; Associate Professor Emerita of Mathematics.

Corbett, Ralph Ashton (1930-1966); B.S., Maine, 1930; M.S., Wisconsin, 1949; Extension Dairy Specialist Emeritus.

Crabtree, Kenneth Gerard (1926-1964); S.B., Massachusetts Institute of Technology, 1923; P.E., (Maine); Professor Emeritus of Electrical Engineering.

Crawford, John Raymond (1930-1962); B.A., Culver-Stockton, 1924; M.A., State University of Iowa, 1929; Ph.D., 1931; Professor Emeritus of Education.

Crosby, Howard (1946-1980); B.S., Maine, 1943; Professor Emeritus of Electrical Engineering.

Crosby, Ruth (1929-1962); A.B., Mount Holyoke, 1919; A.M., Radcliffe, 1920; Ph.D., 1929; Professor Emerita of English.

Crossland, Charles Edward (1917-1961); B.S., Maine, 1917; LL.D., 1962; Vice President for Administration Emeritus.

Cunningham, George S. (1962-1963) (1967-1974); B.A., Maine, 1933; M.Ed., 1958; Professor Emeritus of Mathematics.

Cuozzo, Roscoe F. (1936-1974); B.S., Maine, 1934; M.S., 1952; Extension Animal Specialist Emeritus.

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Eastman, Charles Leslie (1925-1966); B.S., Maine, 1922; Extension Agent Emeritus.

Edwards, Herbert Joseph (1947-1969); Ohio State, 1923; A.M., Princeton, 1927; Ph.D., Ohio State, 1930; Professor Emeritus of English.

Evans, Weston Summer (1923-1962); B.S., Maine, 1918; M.S., 1923; Sc.D., 1962; P.E., (Maine); Dean Emeritus of Technology.

Eves, Howard Whitney (1954-1976); B.S., University of Virginia, 1934; M.S., Harvard, 1936; Ph.D., Oregon State College, 1948; Professor Emeritus of Mathematics.

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Fobes, Kenneth Brown (1948-1972); B.S., in Ed., Maine, 1949; Assistant Dean Emeritus, College of Education.

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Giddings, Edwin (1946-1948) (1968-1977); B.S., Maine, 1933; M.F., Yale, 1934; Associate Professor Emeritus of Forest Resources.

Glanville, Albert Douglas (1937-1971); A.B., Cornell University; M.A., Illinois, 1928; Ph.D. Cornell University, 1932; Professor Emeritus of Psychology.

Grant, Frema Staples (1955-1972); B.S., Farmington State Teachers College; 1929; Extension Agent Emerita.

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Gross, Stuart Murray (1948-1975); A.B., Stanford University, 1932; M.A., 1936; Professor Emeritus of Spanish.

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Hankins, John Erskine (1956-1970); B.A., University of South Carolina, 1924; M.S., 1925; Ph.D., Yale University, 1929; Professor Emeritus of English.

Harper, John Frank, Jr. (1960-1974); B.S., United States Naval Academy, 1931; M.S. Purdue, 1960; Associate Professor Emeritus of Mathematics.

Hauck, Arthur Andrew (1934-1958); A.B., Reed, 1915; Ph.D., Columbia, 1932; LL.D., Lafayette, 1936; LL.D., New Hampshire, 1937; LL.D., Rhode Island, 1943; LL.D., New Brunswick, 1943; LL.D., Reed, 1946; LL.D., Bowdoin, 1947; LL.D., Boston University, 1948; L.H.D., Bates, 1950; L.H.D., Nasson College, 1952;, L.H.D., University of Florida, 1953; LL.D., University of Kentucky, 1953; Litt.D., Colby, 1953; LL.D., Maine, 1958; President Emeritus.

Hawley, Henry Charles (1946-1965); A.B., Oberlin, 1923; M.B.A., Harvard, 1925; D.C.S., 1930; Professor Emeritus of Business and Economics.

Highlands, Matthew Edward (1935-1946) (1947-1970); B.A., Maine, 1928; S.M., Massachusetts Institute of Technology, 1934; Ph.D., University of Massachusetts, 1951; Professor Emeritus of Food Science.

Hill, Beryl B. (1942-1979); B.S., Maine, 1940; Extension Agent and Associate Extension Educator Emerita.

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Jordan, Maynard Fred (1917-1918; 1919-1921; 1925; 1960); B.A., Maine, 1916; M.A., 1921; Professor Emeritus of Astronomy.

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Levinson, Ronald Bartlett (1926-1962); A.B., Harvard, 1919; Ph.D., Chicago, 1924; L.H.D., Maine, 1962; Professor Emeritus of Philosophy.

Libby, Winthrop Charles (1934-73); B.S., Maine, 1932; M.S., 1933; LL.D., Ricker College, 1968; Ped.D., Husson College, 1970; LL.D., Bates College, 1970; LL.D., Colby College, 1971; L.H.D., Unity College, 1972; President Emeritus of UMO.

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McKay, Edgar B. (1947-1973); B.S., Colby, 1930; M.Ed., Maine, 1951; Associate Professor of Modern Society Emeritus.

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Ness, Norman Renfrew (1942-1973); B.S., Maine, 1938; Dairy Specialist Emeritus.

Nutting, Albert Deane (1931-1948) (1958-1971); B.S., Maine, 1927; Director Emeritus, School of Forest Resources.

Oak, Jessie Lawrence (1955-1972); B.S., Maine, 1928; Extension Agent Emerita.

O'Neill, Elmer Wesley, Jr. (1965-1976); A.B., Princeton, 1935; M.A., 1940; Ph.D., 1952; Professor Emeritus of French.

Parsons, Kenneth L. (1942-1977); B.S., Maine, 1934; EE., 1959; P.E., (Maine); Professor Emeritus of Electrical Engineering.

Plummer, Bernie Elliott, Jr. (1925-1968); B.S., Maine, 1924; M.S., 1925; Professor Emeritus of Biochemistry.

Plummer, Henry Almon (1946-1974); B.S., Maine, 1930; M.F., Yale, 1950; Associate Professor Emeritus of Forest Resources.

Pratt, Horace Asa (1930-1971); B.S., Maine, 1930; M.S., 1936; P.E. (Maine); Testing Engineer Emeritus.

Prescott, George Arthur (1961-1976); B.S., in Ed., Boston University, 1941; Ed.M., 1948, Ed.D., 1950; Professor Emeritus of Education.

Randall, Arthur G. (1946-1977); B.S., Yale, 1933; M.F., 1934; Associate Professor Emeritus of Forest Resources.

Randel, William Peirce (1965-1974); B.S., Columbia University, 1932; A.M., University of Michigan, 1933; Ph.D., Columbia University, 1945; Professor Emeritus of English.

Rankin, Rome (1947-1967); M.A., University of Michigan, 1934; Ph.D., University of Kentucky, 1948; Professor Emeritus of Physical Education.

Reed, Frank Dudley (1938-1972); B.S., New Hampshire, 1929; Extension Economist (Marketing) Emeritus.

Reed, Mary Florence (1930-1971); B.A., Maine, 1929; B.S., Simmons College, 1930; Assistant University Librarian Emerita.

Reynolds, Cecil John (1935-1972); B.S.C., Mount Allison, 1926; B.A., 1927; B.A., Oxford, 1929; B.Litt., 1930; A.M., Harvard, 1932; Professor Emeritus of English.

Roberts, Lewis Pollard (1935-1972); B.S., Maine, 1931; Sugar Beet Specialist Emeritus.

Robinson, James A. (1956-1979); B.S., Maine, 1950; Area Potato Specialist and Associate Extension Educator Emeritus.

Ross, Ruth Velma (1960-1972); B.S., State Teacher College, Framingham, Massachusetts 1928; Extension Agent Emerita.

Russell, Olga W. (1966-1978); A.B., Connecticut College, 1934; A.M., University of California (Berkeley), 1939; A.M., Radcliffe College, 1944; Ph.D., 1957; Professor Emerita of French.

Sass, Bernard (1947-1976); B.S., City College, N.Y., 1934; M.A., Columbia University, 1936; Associate Professor Emeritus of Zoology.

Sezak, Samuel (1939-1971); B.A., Maine, 1931; M.Ed., 1953; Professor Emeritus of Physical Education and Athletics.

Sezak, William (1946-1977); B.S., Boston University, 1938; M.Ed., Maine, 1946; Ed.D., Columbia, 1956; Professor Emeritus of Education.

Sheive, Lucy Farrington (1927-1936; 1943-1945; 1956-1969); B.S., Maine, 1927; Consumer Marketing Agent Emerita.

Shibles, Loana Spearin (1946-1961); Castine Normal, 1926; Club Agent Emerita.

Simard, Gerald L. (1967-1977); B.S., Bates, 1933; Ph.D., M.I.T., 1937; Associate Professor Emeritus of Chemical Engineering.

Simpson, Geddes W. (1931-1974); A.B., Bucknell, 1929; M.A., Cornell University, 1931; Ph.D., 1935; Professor Emeritus of Entomology.

Snyder, Mary Ella (1936-1962); A.B., Gooding College, 1919; M.S., Iowa State College, 1936; Associate Professor Emerita of Food and Nutrition.

Sparrow, Evelyn (1926-1972); Associate Registrar Emerita.

Speicher, Benjamin R. (1937-1974); A.B., Denison, 1929; M.S., Pittsburgh, 1933, Ph.D., Professor Emeritus of Zoology.

Stevens, Margaret F. (1951-1977); B.S., Simmons, 1934; Youth Education Specialist Emerita.

Stewart, Alice R. (1947-1980); B.S., Maine, 1937; A.M., Radcliffe College, 1938; Ph.D., 1946; LL.D., University of New Brunswick, Canada, 1979; Professor Emerita of History.

Swinford, Lee Houghton (1959-1972); B.A., University of California, 1923; Ph.D., 1931; Professor Emeritus of Mathematics.

Taylor, Frank Melroy (1940-1973); B.S., Lafayette College, 1928; C.E., 1937; M.S., Maine, 1951; P.E., (Maine); Professor Emeritus of Civil Engineering.

Todd, Frank Harold (1946-1970); B.S., Bowdoin, 1935; M.A., Maine, 1936; Associate Professor Emeritus of Physics.

Trafford, David D. (1947-1979); B.A., Maine, 1939; M.A., Indiana University, 1942; Ph.D., 1947; Professor Emeritus of History.

Trevett, Moody Francis (1946-1972); B.S., Massachusetts State, 1929; M.S., 1940; Professor Emeritus of Plant and Soil Sciences.

Trubov, Herman (1962-1973); B.F.A., Ohio University, 1947; M.A., Columbia University, 1948; Ph.D., Syracuse University, 1956; Professor Emeritus of Education.

Watson, Harry Dexter (1920-1961); B.S., Maine, 1920; M.S., 1929; P.E., (Maine); Professor Emeritus of Mechanical Engineering.

Wells, William Carl (1931-1945) (1947-1972); B.A., Maine, 1931; Director of Residence and Dining Halls Emeritus.

Whelden, Harry C., Jr. (1948-1979); B.S., University of Connecticut, 1948; Poultry Specialist and Extension Educator Emeritus.

Whitehill, Alvin R. (1961-1977); A.B., Dartmouth, 1937; Ph.D., Cornell University, 1942; Professor Emeritus of Microbiology.

Wilson, Edith Grace (1931-1970); B.A., Southern California, 1923; M.A., 1928; L.H.D., Maine, 1970; Dean of Women Emerita.

Witter, John Franklin (1932-1971); B.S., Maryland, 1928; D.V.M., Michigan, 1932; Professor Emeritus of Animal Pathology.

Woodbury, Harold M. (1937-1978); B.S., Maine, 1937; M.A., 1948; Professor Emeritus of Men's Physical Education.

Zieminski, Stefan Antoni (1954-1971); Dipl. Ing., Technical University (Lwow, Poland) 1927; Doctor of Technical Science, 1929; P.E., (Maine); Professor Emeritus of Chemical Engineering.

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Adelaide C. Bird and Alan L. Bird Professor of American History, Dr. Arthur M. Johnson.
Louis Calder Professor of Pulp and Paper Technology, Dr. Joseph Genco.
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FACULTY

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Acheson, James M. (1968); B.A., Colby College, 1962; Ph.D., University of Rochester, 1970; Associate Professor of Anthropology.

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Allen, Douglas M. (1974); B.A., Yale University, 1963; M.A., Vanderbilt University, 1967; Ph.D., 1971; Associate Professor and Chairperson, Philosophy Department.

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Allen, Kenneth W. (1963); B.S., Wheaton College, 1952; M.S., Maine, 1956; Ph.D., Rice University, 1959; Professor of Zoology.

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Andersen, Charles L. (1955); B.A., University of Utah, 1949; M.A., 1951; Assistant Professor of English.

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Anderson, Walter A. (1973); B.S., University of Massachusetts, 1954; M.A., University of Rochester, 1956; Faculty Associate in Geological Sciences.

Andrews, Nancy C. (1977); B.C.E., Presbyterian School of Christian Education, 1960; M.S., Indiana University, 1970; E.D.S., 1971; Ed.D., 1976; Assistant Professor of Education.

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Baker, William J. (1970); B.A., Furman University, 1960; B.D., Southeastern Seminary, 1963; Ph.D., Cambridge University, England, 1967; Associate Professor of History.

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Baranowski, Marc D. (1979); B.A., University of Wisconsin, 1969; M.S., 1973; Ph.D., Pennsylvania State University, 1977; Assistant Professor of Human Development.

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Barger, Ian A. (1980); Visiting Associate Professor in Animal and Veterinary Sciences.

Barkan, Steven F. (1979); B.A., Trinity College, 1973; M.A., State University of New York (Stony Brook), 1976; Assistant Professor of Sociology.

Barrow, Lloyd H. (1979); B.S., Iowa State University, 1964; M.A., University of Northern Iowa, 1969, Ph.D., University of Iowa, 1973; Assistant Professor of Education.

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Battick, John F. (1964); A.B., Boston University, 1958; A.M., 1959; Ph.D., 1967; Associate Professor of History.

Batty, Harry E. (1978); B.A., Washington State University, 1966; M.A., University of Washington, 1970; Assistant Professor of English, General and Liberal Studies.

Bauschatz, Paul C. (1969); B.S., Massachusetts Institute of Technology, 1957; M.A., Columbia University, 1959; Ph.D., 1972; Associate Professor of English.

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Benoit, George R. (1975); B.S., Maine, 1954; M.S., Iowa State University, 1959; Ph.D., Iowa State University, 1961; Faculty Associate in Plant and Soil Sciences.

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Summary of Student Enrollment

1979-80

	MEN	WOMEN	TOTAL
Graduate	498	333	831
Fifth Year	4	0	4
Seniors	986	749	1735
Juniors	900	719	1619
Sophomores	1034	867	1901
Freshmen	1290	1017	2307
Special Students	120	136	256
Two-Year Programs:			
Bangor Community College	265	412	677
School of Engineering Technology	372	12	384
Technical Division of LSA	219	217	436
Onward Program	24	32	56
Continuing Education:			
Degree	5	4	9
Non-Degree	490	869	1359
	6207	5367	11574

CLASSIFICATION BY COLLEGES

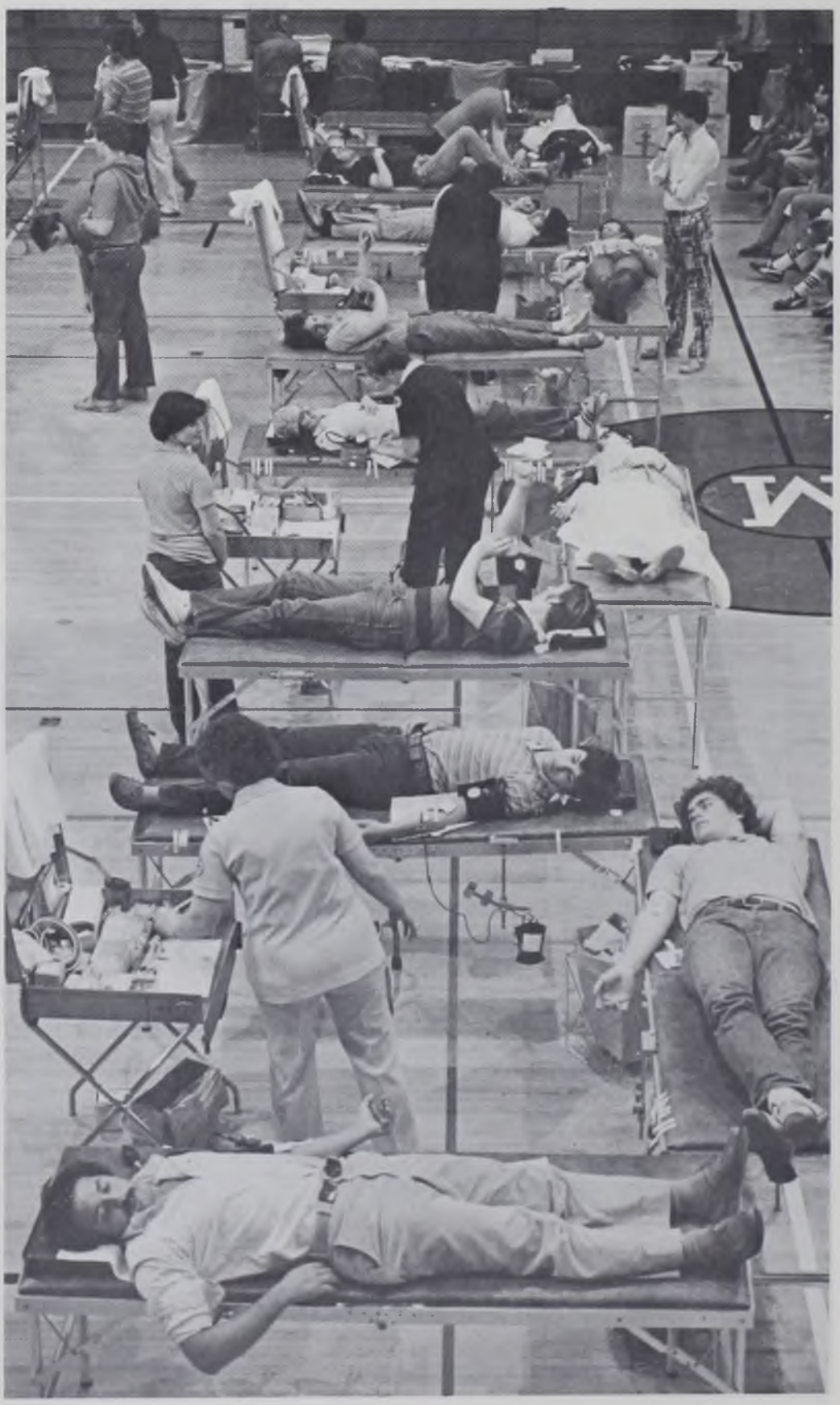
	MEN	WOMEN	TOTAL
Graduate	498	333	831
Arts & Sciences	1420	1633	3053
Bangor Community College	265	412	677
Business Administration	717	278	995
Education	351	502	853
Engineering & Science	897	114	1011
School of Engineering Technology	372	12	384
Life Sciences & Agriculture	949	961	1910
Technical Division of LSA	219	217	436
Onward Program	24	32	56
Continuing Education	495	873	1368
Total	6207	5367	11574

CLASSIFICATION BY RESIDENCE

County (Maine)	MEN	WOMEN	TOTAL
Androscoggin	258	201	459
Aroostook	297	263	560
Cumberland	592	530	1122
Franklin	88	64	152
Hancock	232	284	516
Kennebec	393	328	721
Knox	106	93	199
Lincoln	78	58	136
Oxford	116	95	211
Penobscot	1725	1784	3509
Piscataquis	99	95	194
Sagadahoc	77	72	149
Somerset	165	118	283
Waldo	130	129	259
Washington	113	128	241
York	267	224	491
	4736	4466	9202

State (Other than Maine)	MEN	WOMEN	TOTAL
Alabama	1	–	1
Alaska	–	2	2
Arizona	–	2	2
Arkansas	2	1	3
California	11	6	17
Colorado	2	1	3
Connecticut	177	132	309
Delaware	2	4	6
District of Columbia	4	1	5
Florida	4	5	9
Georgia	2	2	4
Hawaii	–	–	0
Idaho	–	2	2
Illinois	5	4	9
Indiana	2	2	4
Iowa	2	1	3
Kansas	–	1	1
Kentucky	2	–	2
Louisiana	–	–	0
Maryland	13	10	23
Massachusetts	608	389	997
Michigan	5	4	9
Minnesota	1	1	2
Mississippi	–	–	0
Missouri	–	–	0
Montana	1	1	2
Nebraska	–	–	0
Nevada	–	–	0
New Jersey	131	74	205
New Hampshire	76	33	109
New Mexico	1	–	1
New York	157	97	254
North Carolina	2	1	3
North Dakota	–	–	0
Ohio	9	10	19
Oklahoma	–	–	0
Oregon	–	1	1
Pennsylvania	58	20	78
Rhode Island	37	39	76
South Carolina	2	2	4
South Dakota	2	–	2
Tennessee	3	2	5
Texas	6	2	8
Utah	–	–	0
Vermont	56	19	75
Virginia	12	9	21
Washington	3	–	3
West Virginia	–	–	0
Wisconsin	1	–	1
Wyoming	2	–	2
Canal Zone	–	–	0
Guam	–	–	0
Puerto Rico	–	–	0
	1402	880	2282
Country (Other than United States)			
Bahamas	–	1	1
Canada	24	11	35
Central Africa	2	–	2
England	–	2	2

	MEN	WOMEN	TOTAL
Finland	-	1	1
Greece	1	-	1
Guyana	1	-	1
India	6	-	6
Iran	15	-	15
Jamaica	1	-	1
Japan	3	-	3
Netherlands	1	-	1
Nigeria	1	-	1
Norway	1	-	1
South Korea	-	1	1
Spain	-	1	1
Sweden	2	-	2
Switzerland	1	-	1
Syria	1	-	1
Taiwan	3	1	4
Thailand	2	-	2
Turkey	1	-	1
Venezuela	1	1	2
West Africa	1	-	1
West Germany	1	2	3
Total	69	21	90
GRAND TOTAL	6207	5367	11574



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